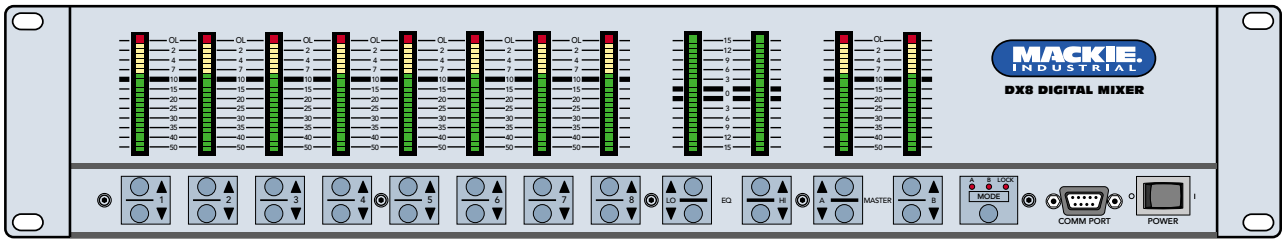
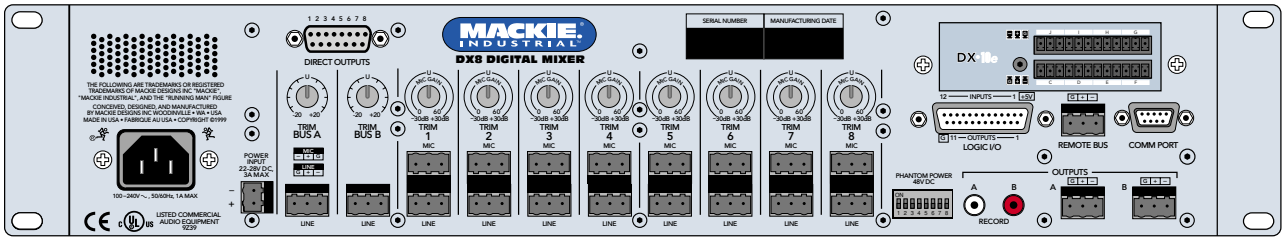
DX810 v3.0
Digital Audio Mixer/ Signal Processor
Instruction Manual





MACKIE.

CAUTION ***AVIS***

RISK OF ELECTRIC SHOCK
DO NOT OPEN

RISQUE DE CHOC ELECTRIQUE
NE PAS OUVRIR

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK
DO NOT REMOVE COVER (OR BACK)
NO USER-SERVICEABLE PARTS INSIDE
REFER SERVICING TO QUALIFIED PERSONNEL

ATTENTION: POUR EVITER LES RISQUES DE CHOC ELECTRIQUE, NE PAS ENLEVER LE COUVERCLE. AUCUN ENTRETIEN DE PIECES INTERIEURES PAR L'USAGER. CONFIER L'ENTRETIEN AU PERSONNEL QUALIFIE.
AVIS: POUR EVITER LES RISQUES D'INCENDIE OU D'ELECTROCUTION, N'EXPOSEZ PAS CET ARTICLE A LA PLUIE OU A L'HUMIDITE

The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure, that may be of sufficient magnitude to constitute a risk of electric shock to persons.

Le symbole éclair avec point de flèche à l'intérieur d'un triangle équilatéral est utilisé pour alerter l'utilisateur de la présence à l'intérieur du coffret de "voltage dangereux" non isolé d'ampleur suffisante pour constituer un risque d'éléctrocution.

The exclamation point within an equilateral triangle is intended to alert the user of the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

Le point d'exclamation à l'intérieur d'un triangle équilatéral est employé pour alerter les utilisateurs de la présence d'instructions importantes pour le fonctionnement et l'entretien (service) dans le livret d'instruction accompagnant l'appareil.

1. SAFETY INSTRUCTIONS

1. Read Instructions — Read all the safety and operation instructions before operating the DX810.

2. Retain Instructions — The safety and operating instructions should be kept for future reference.

3. HEED ALL WARNINGS — Follow all warnings on the DX810 and in these operating instructions.

4. FOLLOW ALL INSTRUCTIONS — Follow all operating and other instructions.

5. Water and Moisture — Do not use the DX810 near water – for example, near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, near a swimming pool, etc.

6. Ventilation — This DX810 should be situated so that its location or position does not interfere with its proper ventilation. For example, it should not be situated on a bed, sofa, rug, or similar surface that may block any ventilation openings, or placed in a built-in installation such as a bookcase or cabinet that may impede the flow of air through ventilation openings.

7. Heat — Locate the DX810 away from heat sources such as radiators, or other devices which produce heat.

8. Power Sources — Connect the DX810 to a power supply only of the type described in these operation instructions or as marked on the rear panel. If using an external DC power supply or battery pack, be sure the voltage corresponds to the range indicated on the rear panel, and that it is connected with the correct polarity.

9. Power Cord Protection — Route power supply cords so that they are not likely to be walked upon or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit the DX810.

10. Object and Liquid Entry — Do not drop objects into or spill liquids into the inside of the DX810.

11. Damage Requiring Service — The DX810 should be serviced only by qualified service personnel when:

A. The power-supply cord or the plug has been damaged; or

B. Objects have fallen, or liquid has spilled into the DX810; or

C. The DX810 has been exposed to rain; or

D. The DX810 does not appear to operate normally or exhibits a marked change in performance; or

E. The DX810 has been dropped, or its chassis damaged.

12. Servicing — The user should not attempt to service the DX810 beyond those means described in this operating manual. All other servicing should be referred to the Mackie Service Department.

13. To prevent electric shock, do not use this polarized plug with an extension cord, receptacle or other outlet unless the blades can be fully inserted to prevent blade exposure.

Pour prévenir les chocs électriques ne pas utiliser cette fiche polariseé avec un prolongateur, un prise de courant ou une autre sortie de courant, sauf si les lames peuvent être insérées à fond sans laisser aucune pariie à découvert.

14. Grounding or Polarization — Precautions should be taken so that the grounding or polarization means of the DX-810 is not defeated.

15. This apparatus does not exceed the Class A/Class B (whichever is applicable) limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of the Canadian Department of Communications.

ATTENTION *—Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant las limites applicables aux appareils numériques de class A/de class B (selon le cas) prescrites dans le règlement sur le brouillage radioélectrique édicté par les ministere des communications du Canada.*

WARNING — To reduce the risk of fire or electric shock, do not expose this appliance to rain or moisture.

CAUTION — Internal lithium battery.
Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type.

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2. INTRODUCTION

The DX810 is our popular DX8 stereo digital audio mixer with the DX10e Expansion Kit installed. This adds eight more balanced outputs and converts it into a powerful matrix mixer/processor. It is designed for use in a variety of installations such as churches, courtrooms, convention centers, and hotels. With eight inputs, ten outputs, and a toolbox full of DSP, the DX810 fits most any installed sound reinforcement application.

Each of the 10 outputs represents a discrete mix of the eight inputs, resulting in a true 8x10 mixing matrix with virtual faders at each crosspoint. It has the ability to group any combination of gain elements to one of 32 groups.

A new software interface provides intuitive setup and operation via a PC. 31-band third-octave graphic or eight-band parametric EQs are available on each output. There is also a three band sweepable high and low shelving EQ with a fully parametric mid-range control on each input.

The processing power provided by the DX810 permits inserting a gate on each input, as well as a compressor on each input and output. It also permits inserting signal delay on each output, and creating crossover groups with custom high, low, or bandpass filters applied to each output. Up to five outputs can be assigned to a crossover group.

Each of the eight input channels is terminated to two Phoenix-type detachable connectors. Each connector is optimized to accept either microphone or line-level signals. Microphone preamplifiers employ Mackie's proprietary XDR™ technology to offer studio-class audio performance. Phantom power of 48 VDC is switchable individually on each input. Two auxiliary line-level inputs with trim are provided, allowing analog signals to be mixed with the A and B master mixes. All main outputs deliver balanced line-level signals to detachable Phoenix-type connectors. The main A and B outputs also deliver buffered unbalanced signals to RCA connectors intended for recording.

The DX810 offers an intuitive front panel user interface for the A and B outputs. It consists of dual-function LED bar graph meters for each input and the A and B outputs. Input meters indicate the presence of signal before signal processing (pre-fader). Output meters indicate the actual level at output (post-fader). Levels are set by means of UP/DOWN pushbuttons dedicated to each input and output. A MODE button is used to select between Mix A and B. This allows adjustment of levels to both mix outputs from the same set of input controls. A third function of the MODE button allows the user to LOCK the front panel controls until a security unlock code is entered.

The DX810 offers flexible interface options through dedicated inputs and outputs for control and programming purposes. Two independent RS232 connectors are provided, one on the front panel and one on the rear, for connection to a computer or control system. A multi-pin (DB25F) connector on the rear panel allows interface among the 10 Logic Inputs and 10 Logic Outputs. This interface connects to switches, LEDs, and other devices, enabling hardware control and indication from custom control panels. All logic inputs and outputs are programmable in software. A proprietary remote control bus allows connection of the optional wired remotes over three-conductor cable. Remotes are available in Volume Control (DX-RVC) and 4-Switch (DX-SW4) versions and may be combined in any configuration.

The DX810 is supplied with DX-810-PC software that allows access to all of the system's settings and configurations. The software provides access to the 3-band input EQ, 31-band graphic EQ, eight-band parametric EQ, compressors, gates, delays, and crossover configuration. Group assignments and room combining are also configured in the software application. In addition, it allows saving and recalling up to 24 presets, configuration for input force on/force off functions with priority, and for the logic input and output connections. All settings and text labels are retained in the DX810, and can be saved on the computer's local drive.

The DX810 is UL and CE approved and designed for continuous use in professional fixed installation systems. An internal auto-ranging power supply allows connection to mains voltages from 90-240 VAC at 50/60 Hz. This is without requiring jumper or switch setting changes. A 24 VDC input is provided for applications where backup power is required. Switchover to backup power is automatic and silent.

Key Features

- 32-bit DSP and 24-bit Analog/Digital Conversion
- 8 balanced XDR™ Mic/Line inputs with trim
- 2 balanced Line inputs direct to mix buses A and B
- 10 Independent Mix Buses and balanced Outputs
- 2 unbalanced Record Outputs
- 8 unbalanced Direct Channel Outputs

Part No. 0001335 Rev. B 11/02
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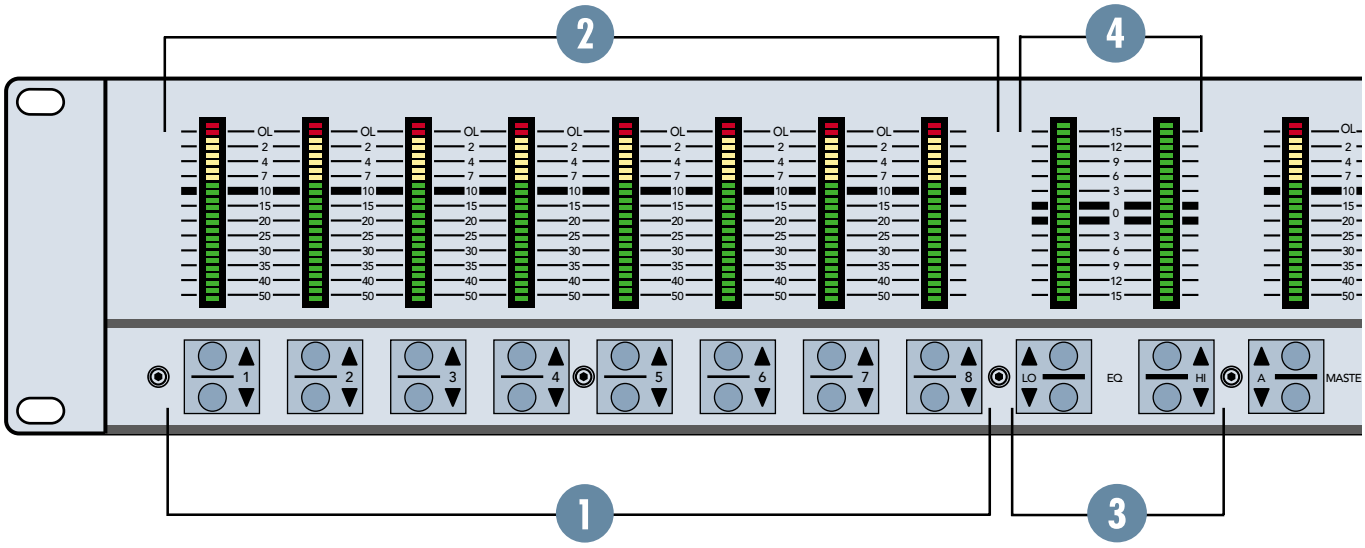
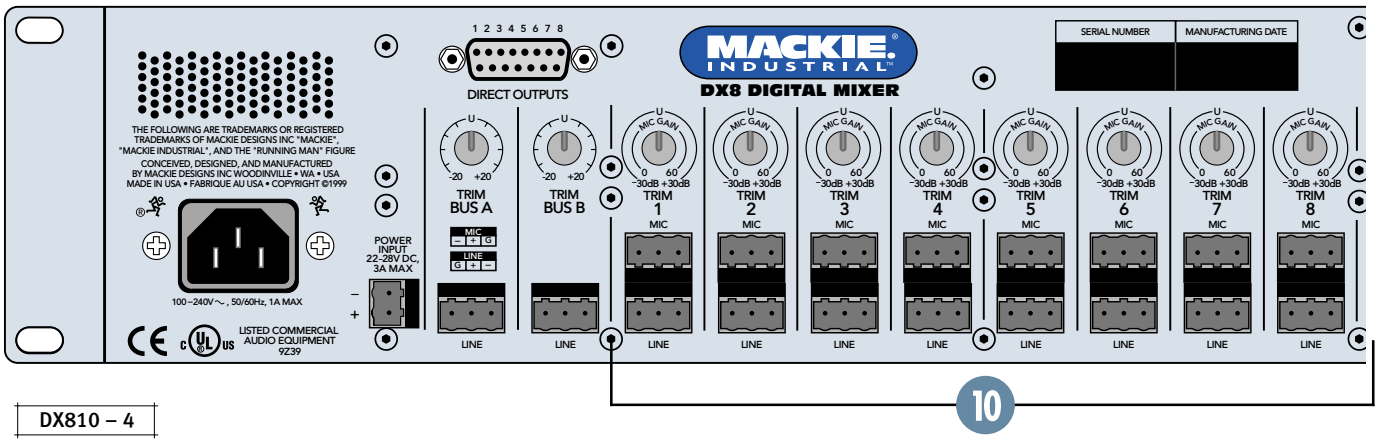
New Features in Version 3.0

- Individual Level/Peak (PPM) metering on each Input
- 2-band sweepable shelving EQ with a parametric mid on each Input
- Gating on each Input
- 31-band Graphic EQ or 8-band Parametric EQ on each Output
- Fully variable Compressor on each Input and Output
- Variable delay on each Output
- Configurable crossover for up to five bands
- 10 Programmable Logic Inputs
- 10 Programmable Logic Outputs
- 2 independent RS-232 interface ports
- 48 VDC Phantom Power switch per input
- 24 VDC Backup Power input
- Hardware Expansion Port accepts optional modules
- PC Software application included
- Two levels of password protection
- Powerup Preset
- Solo button on each Input
- Enable and Exclusive Enable
- Audio Input window renamed Force Control with Logic In and Gate activation
- Group priority assignments
- Groups added to Logic Inputs Affected I/O
- More functions added to Logic Outputs
- Direct link to DSP controls from the Input and Output Processor View
- Room Combining with up to 16 different combinations available
- Bessel filter selection added to Linkwitz-Riley and Butterworth in Crossover window
- Preset names now appear in Preset box
- User adjustable ramp time between presets
- Global Output fader assign overrides presets
- Force On/Off Group and Combine selection added to remote control




DIRECT OUTPUTS
MACKIE
INDUSTRIAL
DX8 DIGITAL MIXER
SERIAL NUMBER
MANUFACTURING DATE
THE FOLLOWING ARE TRADEMARKS OR REGISTERED TRADEMARKS OF MACKIE DESIGNS INC "MACKIE", "MACKIE INDUSTRIAL", AND THE "RUNNING MAN" FIGURE
CONCEIVED, DESIGNED, AND MANUFACTURED BY MACKIE DESIGNS INC WOODINVILLE • WA • USA
MADE IN USA • FABRIQUE AU USA • COPYRIGHT ©1999
100–240V~ , 50/60Hz, 1A MAX
LISTED COMMERCIAL AUDIO EQUIPMENT 9Z39
POWER INPUT 22-28V DC, 3A MAX
TRIM BUS A
TRIM BUS B
TRIM 1 MIC
TRIM 2 MIC
TRIM 3 MIC
TRIM 4 MIC
TRIM 5 MIC
TRIM 6 MIC
TRIM 7 MIC
TRIM 8 MIC
LINE
10

Front Panel Features

Note: The front panel controls only apply to the A and B outputs. Outputs C through J are controlled with the DX-810-PC software interface.

1 INPUT UP/DOWN BUTTONS

Use these buttons to adjust the mix level for each input channel.

2 INPUT LED DISPLAY

This indicates the signal level after the mic preamp stage, just after the A/D converter, but prior to any digital signal processing. When any input UP/DOWN button is pressed, all the meters (except EQ) switch from level metering to level setting indication. After five seconds, the meters switch back to normal peak program metering (PPM).

When the 10 and 7 LEDs are both lit, the gain is set to unity (0 dB).

3 EQ LO/HI UP/DOWN BUTTONS

These buttons are disabled in the DX810 (they are for DX8 use only).

4 EQ LED DISPLAY

This display is disabled in the DX810 (it is for DX8 use only).

5 MASTER A/B UP/DOWN BUTTONS

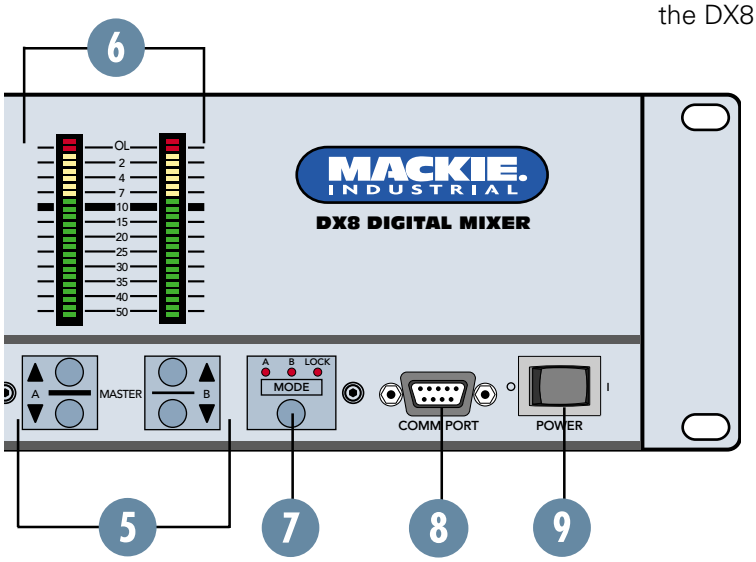
These buttons adjust the output level for the A and B output buses.

6 MASTER OUTPUT LED DISPLAY

This indicates the signal level after the digital signal processing and MASTER A and B gain stage, just prior to the D/A converter. When any MASTER UP/DOWN button is pressed, all the meters switch from level metering to level setting indication. After five seconds, the meters switch back to normal peak program metering (PPM).

7 MODE

This switch changes the front panel operation between Bus A and Bus B operation. In addition, the LOCK position disables the front panel controls to prevent unauthorized changes to the settings. A security code must be entered to enable the front panel controls when the DX810 is locked. See page 13 for more information on locking and unlocking the DX810.



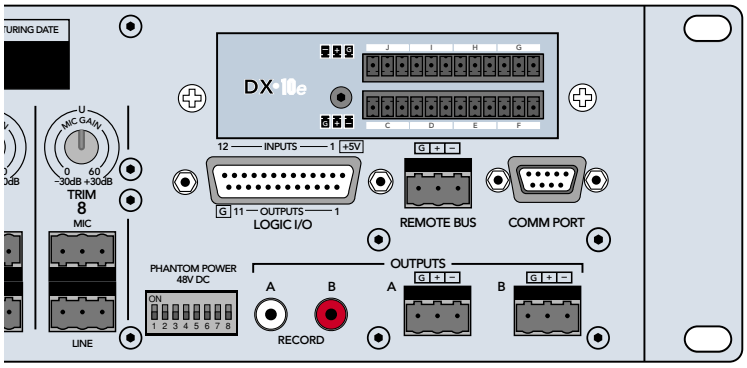
8 COMM PORT

This is an RS-232 port on a 9-pin D-Sub connector. It connects to a personal computer or other compatible control system for external control of the DX810 settings. A second COMM port on the rear panel duplicates this function, for permanent connection to an installed controller.

9 POWER

Use the POWER switch to turn the DX810 on and off.

Rear Panel Features



10 INPUTS 1-8

Each of the eight analog inputs has separate balanced mic and line input connectors that use Mackie's acclaimed XDR mic preamps. These are 3-pin Phoenix-type connectors. Use either the MIC or LINE input, but only one can be used per channel.

11 TRIM

This rotary analog control is used to trim the gain of the input signal for optimum signal-to-noise ratio in the preamp stage. For mic-level signals, it provides from 0 to +60 dB of gain. For line-level signals, it provides from –30 dB to +30 dB of gain. Unity (0 dB) is at the center position. This control accepts a maximum input signal of +18 dBu before clipping (at unity gain).

12 PHANTOM POWER

These switches apply phantom power (+48 VDC) to pins 2 and 3 of the selected mic input connectors. Put the **PHANTOM POWER** switch in the UP position for an individual channel when using a condenser microphone.

13 BUS A/B INPUTS

These analog inputs accept balanced line-level signals and route the signal to the internal A and B buses. These inputs may serve as additional zone inputs for program devices. There is no DSP processing on these inputs.

14 BUS A and B TRIM

These rotary analog controls are used to trim the gain of the inputs to the A and B buses. This trim control provides from –20 dB to +20 dB of gain, with unity (0 dB) at the center-detent position.

15 DIRECT OUTPUTS

This 15-pin D-Sub connector supplies an analog, unbalanced line-level signal from each of the eight program inputs, post-preamp and pre-processing. Use these outputs to connect to another mixing console for additional zone coverage, a telephone system for music-on-hold, or a multi-track recorder. See page 7 for the Direct Output pinouts.

16 RECORD Out

These RCA connectors supply unbalanced line-level signals from the **A** and **B** outputs. Use these outputs to connect to the inputs of a recorder. They can also act as additional line-level outputs to connect to an external power amplifier. The signals are the same as the main outputs.

17 OUTPUTS A/B

These 3-pin Phoenix-type connectors supply a balanced line-level signal from **OUTPUTS A** and **B**.

18 LOGIC I/O

This 25-pin D-Sub connector provides 10 logic control inputs and 10 logic control outputs (open-collector). These inputs can be used to control a wide variety of DX810 functions via external switching. The outputs can be used to provide logic for external indicators for a number of internal settings and conditions. They can also control switching to external devices. The function of each logic input and output can be programmed via software to suit individual applications. In addition, logic output 11 is dedicated to the "System OK" function. See page 8 for the Logic I/O pinouts.

19 REMOTE BUS

This 3-pin Phoenix-type connector can be used to attach optional remote controls to the DX810. Several remote controls can be connected to each other in a daisy-chain fashion to extend the remote control functionality of the DX810.

20 COMM PORT

This is identical to the **COMM PORT** on the front panel. Use this to connect to an RS-232 serial port on a personal computer or third-party controller (i.e., show controller) for external control of the DX810.

21 DX10e Expansion Panel

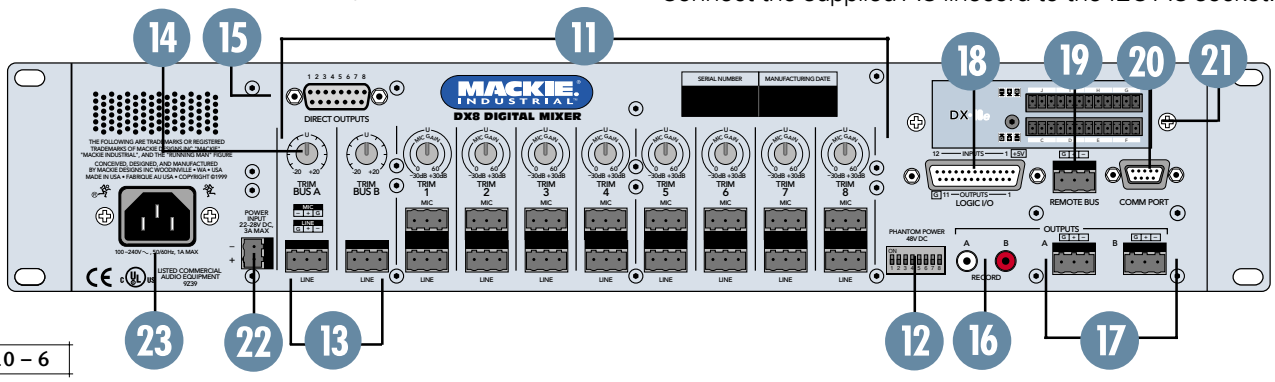
The DX10e provides eight additional independent balanced output mixes, (**C-J**).

22 24 VDC POWER

The DX810 can be powered using a 24 VDC power supply. This can serve as the primary power supply for the DX810, or as a backup supply in case of an AC power failure. The DX810 seamlessly switches to the backup supply if there's a power loss. When both AC power and 24 VDC power are connected, the AC power is used and no current is drawn from the DC supply.

23 IEC AC Socket

Connect the supplied AC linecord to the IEC AC socket.



3. INSTALLATION

Connections

Connecting Balanced Sources

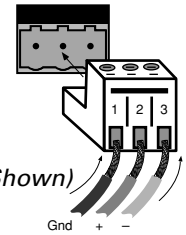
Use high-quality three-conductor cable for balanced connections, such as Star Quad by Belden, Canare, or Mogami, etc. The better the shield, the better the audio signal is protected from induced EMI and RFI.

Note: With screw-down connectors, it's best to use stranded wire that is not tinned. Solder can "flow" under the pressure of the screw-down terminal and cause the connection to become loose.

To connect a balanced mic or line-level signal:

Strip the wire back about 1/4" inch. Insert the wire as far as it will go into the appropriate hole in the supplied Phoenix-type connector. Tighten down the screw with a small slot-head screwdriver. It is recommended that you use 20 or 22 gauge wire with the Phoenix-type connectors. The connectors are wired as follows:

Pin 1 = Ground (Shield)
Pin 2 = Hot (+)
Pin 3 = Cold (–)



Balanced Connection (Line Input Shown)

Note: To connect to the MIC inputs, turn the connector upside-down relative to the LINE input connector. Double check the wiring with the wiring graphics indicated on the rear panel.

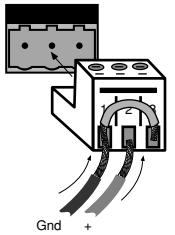
Connecting Unbalanced Sources

It may be necessary to connect a 2-conductor unbalanced input to a balanced input on the DX810.

To connect an unbalanced line-level signal:

Follow the instructions for connecting a balanced line-level signal above, but wire the connector as follows:

Pin 1 = Ground (Shield)
Pin 2 = Hot (+)
Pin 3 = Ground

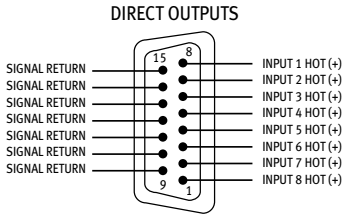


Unbalanced Connection

Connecting the DIRECT OUTPUTS

This is a 15-pin D-Sub connector. The signals on the DIRECT OUTPUT are unbalanced. Use shielded, twisted pairs for the DIRECT OUTPUT cable to ensure the best rejection of external noise (EMI and RFI).

The DIRECT OUTPUT connector is wired as follows:



DIRECT OUTPUTS Pinout Connection

Connecting the RECORD Outputs

These are RCA-type unbalanced connectors. Use high-quality shielded cable with RCA-type plugs for these connections.

Connecting the Bus A and B Outputs

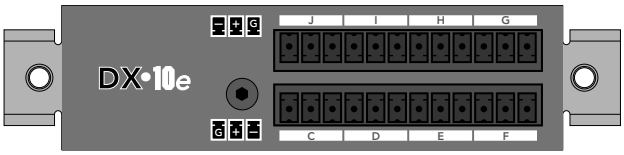
These are 3-pin Phoenix-type connectors that provide a balanced line-level output signal from Bus A and Bus B. Use high-quality, three-conductor shielded cable for these connections.

Strip the wire back about 1/4" inch. Insert the wire as far as it will go into the appropriate hole in the supplied Phoenix-type connector. Then tighten down the screw with a small slot-head screwdriver. It is recommended that you use 20 or 22 gauge wire with the Phoenix-type connectors. The OUTPUT connectors are wired as follows:

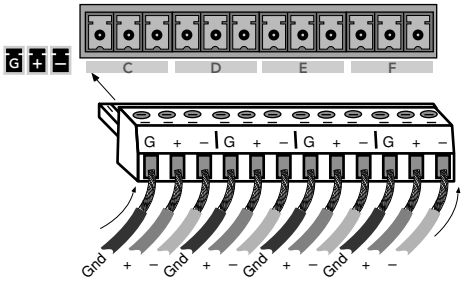
Pin 1 = Ground (Shield)
Pin 2 = Hot (+)
Pin 3 = Cold (–)

Connecting the Bus C-J Outputs

Outputs C-J are on the DX•10e connector panel.

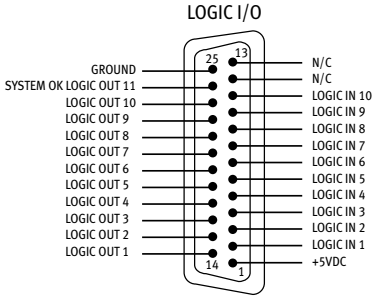


The DX•10e Expansion Kit includes two 12-position Phoenix-type connectors for connecting to the DX•10e connector panel. These are wired as indicated on the connector panel. Notice that the top connector is wired the same way as the bottom connector; however, it is turned upside-down when it is plugged into the unit.



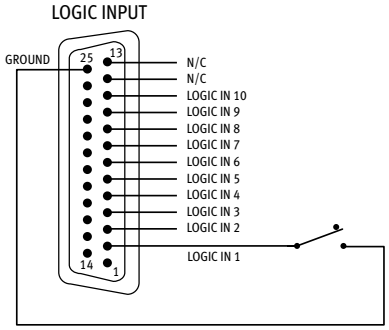
Connecting the LOGIC I/O

This is a 25-pin D-Sub connector. There are 10 programmable logic inputs and 10 programmable logic outputs. In addition, there is an 11th fixed logic output to indicate "System OK." They are all active-low circuits. Use 22 gauge wire for these connections.



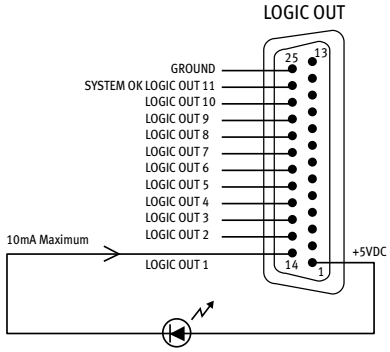
LOGIC I/O Pinout Connection

The logic inputs are active-low with internal pull-up resistors connected to +5 VDC. Use a normally open switch connected between the logic input and ground (pin 25). When the switch is closed, the logic input is active. Depending on the function assigned to the logic input, a toggle switch or a momentary switch may be used.



LOGIC INPUT Connection

The logic outputs are active-low, open-collector outputs with internal pull-up resistors. Connect the indicator or activation circuit between the logic output and +5 VDC (pin 1). When the output is active, the output is 0 VDC. The logic outputs can supply up to 10 mA of current each.



LOGIC OUTPUT Connection

Note: Pins 12 and 13 are not used at this time. They are reserved for future updates. ***Do not connect anything to these pins.***

Connecting the REMOTE BUS

This is a 3-pin Phoenix-type connector specifically for connecting the optional remote control peripherals. Use a high-quality three-conductor shielded cable to make this connection, such as Belden 8451, 9451, or equivalent. The lower the nominal capacitance of the wire, the more distance you can have between the remote control and the DX810. This is in order to avoid transmission losses.

Strip the wire back about 1/4" inch. Insert the wire as far as it will go into the appropriate hole in the supplied Phoenix-type connector. Then tighten down the screw with a small slot-head screwdriver. It is recommended that you use 18, 20, 22, or 24 gauge wire for the remote control connections. The guage used depends on the distance between the DX810 and the remotes.

The REMOTE BUS connector is wired as follows:

Pin 1 = Ground (Shield)
Pin 2 = Data + (with +24 VDC power)
Pin 3 = Data – (with +24 VDC power)

Note: See the instructions with the remote control for more information.

AC Power Considerations

The DX810 can accept an AC voltage ranging from 90 V to 240 V without having to reconfigure the primary wiring. This is due to the sophisticated design of the switching power supply. Each DX810 draws an average of 1 amp of AC line current at 120 VAC.

Warning: Always use a 3-conductor AC power cord with a safety ground connection. Never remove the ground pin or attempt to bypass it. This is very dangerous.

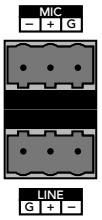
4. OPERATION

Quick Start

Reading the instruction manual is the only way to fully understand the features and functions of the DX810. However, this Quick Start section provides a quick overview to get the DX810 set up and working fast.

Make sure the power switch is off while setting up and making connections to the DX810.

Make the Connections



Determine which inputs to use for program sources and which to use for microphones. Follow the wiring diagram on the rear panel to make the connections.

Make use of the PHANTOM POWER switches if any of the microphones require phantom power. Phantom power is present when the switch is in the UP position.

Make use of the supplied Phoenix connectors with appropriate wiring to connect the DX810 outputs to the amplifier inputs. Connect the power amplifier outputs to speakers appropriate for the amplifier's specified output power.

Connect a personal computer loaded with the DX-810-PC control software to the COMM PORT on the DX-810. This is for maximum control and ease of use. The RS-232 serial port from the computer can be connected to either COMM PORT on the DX-810 (front or rear panels).

Start Up

Before turning on the DX810, set the TRIM controls all the way down.

Turn on the DX810 power switch. Open the DX-810-PC control software on the computer and click On Line. This begins the communication between the DX810 and the computer.

Configure the DX810 for the current application. Download the appropriate plug-ins, if installed. Set all the EQ controls flat. Adjust the input faders and the output faders all the way down.

Tip: To speed things up, select Output A and set all the Input faders down. Select Copy Mix Levels from the Edit menu. Select Output B and select Paste Mix Levels from the Edit menu. Repeat for outputs C-J.

Set the Levels

MIC and LINE Input Trim

The analog trim controls on the rear panel are not adjustable via the control software. This is because these are in the analog domain, prior to the A/D converters. To adjust the MIC and LINE TRIM controls:

1. Start the program source playback for Input 1 or, if a microphone is connected, have someone speak into the microphone at a normal volume.
2. Adjust the Input 1 TRIM control so the meter indication is at or around –10 dB. The peaks should regularly hit, and occasionally exceed the –10 dB level. This provides plenty of headroom for transient peaks.

Input Mix Levels

After setting the MIC and LINE TRIM controls as instructed above, adjust the input mix levels to unity gain (Ctrl + click on the fader to set it to unity gain). Adjust the input faders on the eight input channels individually to achieve a balanced mix.

Output Levels

Before adjusting the output faders, turn on the power amplifier.

If the power amplifier has level controls:

1. Turn the amplifier level controls all the way down.
2. Adjust the output faders to unity "U" on-screen. Have the program sources playing. The peaks on the master output meter should regularly hit, and occasionally exceed the –10 dB level. This provides a nominal +4 dBu level at the OUTPUTS.
3. Slowly increase the amplifier level controls to attain the volume level desired. If the volume gets too loud too fast, adjust the output level controls to –15 dB or –20 dB. If the volume level isn't loud enough, adjust the output faders to –5 or –10. Be careful that the peak level doesn't hit the OL (overload) indicator on the meter, as this may run the risk of driving the output into clipping.

If the power amplifier doesn't have level controls:

1. Slowly adjust the output faders until the –10 and –7 dB LED indicators light (or to unity "U" on-screen). They may also be adjusted until the desired volume level is attained. If the volume level isn't loud enough, adjust the output faders to –5 or –10. Be careful that the peak level doesn't hit the OL (overload) indicator on the meter, as this may run the risk of driving the output into clipping.

Bus A and B Input Trim

There is no metering after the BUS A and B input TRIM controls. These controls must be adjusted by ear. Start the program source playback for all sources connected to the BUS A or BUS B input. Slowly increase the TRIM control to the center position (12 o'clock), which is unity gain. Then adjust the TRIM control up or down to attain a balance within the total mix at the A and B outputs.

Accessing the Digital Signal Processors

The DX810 has five powerful floating-point 32-bit digital signal processors (DSPs) to implement the digital audio processing functions. Access the processing windows by clicking on their buttons in the Button Section, or double-clicking on the DSP name in the Input Proc or Output Proc windows.

- Input 3-Band Shelving EQ With Parametric Mid-Range Control
- Output 8-Band Parametric EQ
  or
- Output 31-Band 1/3 Octave Graphic EQ
- Input/Output Compressors
- Input Gate
- Output Delay
- Crossover

Plug-Ins

A number of software plug-ins will be available to download to the DX810 via the COMM PORT connection to a PC. Plug-ins can be used along with the EQs and compressor described above. Check the Mackie website at www.mackie.com for availability.

Using Inputs 1-8

Connect the microphones or program sources to Inputs 1-8. Examples of program sources include a CD player, tape deck, tuner, satellite feed, TV audio, jukebox, or other audio source. Each input has a separate Phoenix-type connector for a mic or line-level input.

TRIM

Use the TRIM control to adjust the gain of the input preamp stage according to the level of the input signal. Refer to the "Quick-Start" section (Set the Levels) for instructions on how to set the TRIM controls.

LEVEL

The up/down arrow buttons on each channel are used to adjust the mix level for each channel going to the A and B outputs (use the on-screen faders for outputs C-J). Use these to fine tune the mix or relative loudness of each input signal that is connected to the DX810.

When adjusting these buttons, the channel meter indicates the gain of the channel relative to the maximum gain of +10 dB. After 5 seconds, the meter reverts back to indicating the actual input signal level of the channel. This metering is pre-EQ and pre-LEVEL control.

Unity gain is indicated when the –10 and –7 dB LEDs are both lit on the meter (or "U" on-screen).

EQ

Each Input 1-8 has a 3-band shelving EQ with a parametric mid. This is adjustable from the PC only. It provides 15 dB of boost or cut with user selectable corner and center frequencies (LO: 20 Hz-500 Hz; MID: 20 Hz-20 kHz HI: 500 Hz-20 kHz).

Using the BUS A and B Inputs

These inputs provide a direct analog connection to the BUS A and B buses. These input points are post-DSP and post-D/A converter, and accept a balanced analog line-level signal. Use these to connect an additional program source to a zone, or to connect the Zone A and B outputs from another DX810.

TRIM

Use the TRIM control to adjust the signal level at the BUS A and B inputs. Typically, this control would be set to the center detent position (unity gain). However, it can be adjusted up or down by 20 dB to achieve a balance between the signal at the BUS A and B inputs, and the signal on the internal A and B buses.

Using the DIRECT OUTPUTS

The DIRECT OUTPUTS provide an unbalanced line-level signal from each of the 8 Input channels. This signal comes from the output of the preamplifier stage on each input channel, prior to the A/D converter and subsequent digital signal processing.

Use the DIRECT OUTPUTS to connect a continuous music source (e.g., satellite feed, prerecorded background music, or multi-disc CD player). This may connect to a telephone system music-on-hold input. It may provide a feed to a multi-track recorder (for recording), or a mixing console (for additional zone coverage).

Using OUTPUTS A Through J

These outputs provide a balanced line-level signal. Connect these outputs to the inputs of a power amplifier.

Using the RECORD Output

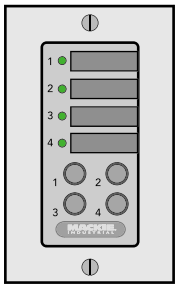
The A and B output signals are provided at the RECORD output jacks, which are industry standard unbalanced RCA connectors. Connect these to the Tape Input jacks on a tape deck or other recording device to record the mix at the A and B outputs.

Using the REMOTE Controls

Connect one or up to nine remote controls to the REMOTE BUS connection. Each remote control has an 8-position DIP switch that must be set to a unique ID. When the DX810 is first turned on, it polls the REMOTE BUS and identifies the remote controls connected to it by each unique ID.

There are two remote control versions available:

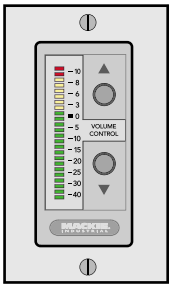
DX-SW4 Selection Remote (4-Button/4-LED)



This remote device is designed to select functions such as preset selection, mute, and force-on/off. Each of the four buttons controls a single function and its associated LED displays the current state of the function.

Refer to Appendix C for a list of the predefined functions available for the Selection Remote Control.

DX-RVC Level Remote (2-Button/12-LED)



This remote device can control a level, preselected via the 8-position DIP switch, and display the selected level on the LED meter. The predefined functions include Input 1A-8J level, OUTPUT A through J, and Group 1-32 level. Note that the remote control indicates the gain setting of the channel, and not the signal level in real time.

Refer to Appendix D for a list of the predefined functions available for the Level Remote Control.

Connecting One or More Remote Controls

The remote control devices are connected to the DX810 using a 3-wire half-duplex interface with +24 VDC phantom power. The REMOTE BUS connection can provide power for up to nine remotes. Provision is made to connect local power to the remote controls if required in certain applications.

The maximum distance between the DX810 and the remotes depends on the type of cable selected and type of remote controls used. Generally, with 22 gauge wire (at 0.014 Ω/ft. and 34 pF/ft), one remote can be up to 3000 feet away. Five remotes can be up to 2500 feet away, and eight remotes can be up to 500 feet away. This is to prevent transmission losses from becoming a factor. (See the instructions with the remote control for more information).

Using the LOGIC I/O

The DX810 has 10 programmable general-purpose logic inputs, 10 programmable general-purpose logic outputs, and one preconfigured logic output (System OK). The inputs are active low with internal pull-up resistors. The outputs are active low open-collectors with internal pull-up resistors. With the inputs or outputs unconnected or inactive, the logic voltage level is high (+5 V). The active state is defined as voltage low (0 V or ground).

The logic functions assigned to each individual logic input and output are configured using the DX-810-PC application. In addition, each logic input and output can be assigned a descriptive name (up to 32 characters) for easier identification within the PC application.

Note: Logic I/O functions are set from the PC application only.

Logic Inputs

The following functions can be activated by the logic inputs:

Force On
Force Off
Input Mute/Enable
Output Mute/Enable
Group Mute/Enable
Preset Recall
Combine On

Force-on/Force-off

This provides a means to temporarily increase or decrease the gain of an input channel or group with an external switch, remote control, or through the priority function. This is defined in the Force Control window in the DX-810-PC software application. It forces the input fader level to the Force On Level or Force Off Level selected for that channel (relative to the current setting). It forces the group fader level (when selected under Affected I/O in the Logic Input window) to its current fader level (Force On) or completely off (Force Off). See "Force Ctrl" on page 19 for more information about the Force-on and Force-off function.

This function can be activated in one of four ways, and is active when the logic input pin is active (held low):

- Momentary: The force function is continuously active while the logic input is continuously active.
- Latch On: The force function is activated when the logic input goes from inactive to active.
- Latch Off: The force function is deactivated when the logic input goes from inactive to active.
- Toggling: The force function toggles its state when the logic input goes from inactive and active.

Mute/Enable

An input, output, or group can be muted or enabled with a Logic Input (see page 28 for information on changing between mute or enable operation). This function can be activated in one of four ways:

- Momentary: The mute/enable function is continuously active while the logic input is continuously active.
- Latch On: The mute/enable function is activated when the logic input goes from inactive to active.
- Latch Off: The mute/enable function is deactivated when the logic input goes from inactive to active.
- Toggling: The mute/enable function toggles its state when the logic input goes from inactive and active.

Preset Recall

This function can be activated as a momentary function or as a latching function. When activated as a momentary function, the preset state is recalled only when the logic input is active. When the logic input is inactive, the DX810 returns to its base state as long as no other momentary function is in force. Normally, the base state is the state the DX810 was in prior to activating the preset state.

When activated as a latching function, the preset state is recalled when the logic input goes from inactive to active. See "Presets" on page 18 for more information about the preset recall function.

Combine

This function can be activated as a momentary function, a latching function, or a toggling function. When activated as a momentary function, the selected combination is activated only when the logic input is active. When the logic input is inactive, the combination is deactivated.

When activated as a latching function, the combination is activated when the logic input goes from inactive to active (Latch On), or the combination turns off when the logic input goes from inactive to active (Latch Off).

When activated as a toggling function, the combine state changes from its current state when the logic input goes from inactive to active.

See "Combine" on page 21 for more information about the room combining function.

Logic Outputs

The logic outputs indicate the state of the following conditions, selectable in software:

Input Mute/Enable
Output Mute/Enable
Group Mute/Enable
Output Signal Present
Preset Active
Force On Active
Priority Active
Combine Active
Gate Status

Mute/Enable

A logic output can indicate when the mute or enable for a particular input, output, or group is active. See page 28 for information on changing between mute or enable operation.

Output Signal Present

A logic output can indicate when a signal greater than –40 dBFS is present on an output.

Preset Active

A logic output can indicate when a particular preset is active.

Force On

A logic output can indicate when a particular input or group is being forced on.

Priority Active

A logic output can indicate when a particular input or group force-on priority is active.

Combine Active

A logic output can indicate when a particular combination (combine) is active.

Gate Status

A logic output can indicate when a particular Input Gate is open.

Note: An input gate that is disabled (off) is always open.

Password Protection

There are two levels of password protection, User and Administrator.

User Level

User level provides access to the front panel controls and the fader controls in the DX-810-PC application.The MODE button on the front panel is used to disable the front panel controls by selecting LOCK. The LOCK LED blinks for about five seconds before it engages. When the LED lights steadily, the front panel controls are disabled.

To unlock the DX810 from the front panel, press the bottom "Down" buttons on the front panel in the correct numerical sequence. Use the following chart:

Input 1 Down = 1
Input 2 Down = 2
Input 3 Down = 3
Input 4 Down = 4
Input 5 Down = 5
Input 6 Down = 6
Input 7 Down = 7
Input 8 Down = 8
Low EQ Down = 9
Hi EQ Down = 0

Note: The default User Lock Code is "1234." The buttons must be pressed in rather rapid sequence in order to unlock the front panel (no more than about 1 second between key presses).

Administrator Level

Administrator Level provides access to all of the DX-810-PC software application functions. When you click the On Line button in the application to begin communication between the application and the DX810, the Enter Pass Code window opens. Entering the four-digit User Pass Code limits you to fader control only. Entering the four-digit Administrator Pass Code (previously defined in the Set Lock Code window under the Advanced menu) allows you full access to the software controls.

Note: The default administrator code is "1234."

5. DX-810-PC SOFTWARE (v 3.0)

Installing the Software

A PC-based Windows-style graphical interface software application is provided on a CD-ROM. This is to control and configure the DX810 at the point of installation.

Check our website at www.mackie.com/install/dx810 for software upgrades as they become available.

To install the software on a PC:

It is necessary to install the DX-810-PC software on your PC.

1. Make sure no other applications are running.
2. Insert the DX810 CD into your PC's CD drive, or download the software from www.mackie.com/install/dx810.
3. The CD should begin the installation automatically. If not, click **Start**, then click **Run**.
4. Type <drive>:\DX-810-PC\Setup in the command line (where <drive> is the letter assigned to the CD drive, i.e., D drive, or the location on your hard drive where the file was downloaded).
5. Setup will install the DX-810-PC application onto your PC. You can accept the default directory, or specify a different location to install the application.

Upgrading the Software

From time to time, Mackie Designs will release upgrades for the internal operating software in the DX810. This can be downloaded from our website (www.mackie.com) to a PC-compatible computer. Use the serial port on the computer to connect to the COMM PORT on the DX810. Then transfer the data to the on-board flash memory with the DX-810-PC software.

Connecting a PC

Use a standard DB9 (male/female) computer cable to connect a PC to the DX810. The DX-810-PC application uses COM1 on the PC by default. You can select a different COM port by clicking on **Advanced** in the top menu bar and selecting **Configure COM Ports.** Refer to "Configure COM Ports" on page 16 for more information. Connect the COM port on the PC to one of the **COMM PORT**s on the DX810 (front or rear).

Upgrading the Firmware

Before attempting to go "Online" with the DX810, you must upgrade the firmware in the DX810's flash memory.

1. Connect the PC to the DX810 as described above.
2. Open the DX810 v3.0 software. **DO NOT** click the **On Line** button yet.
3. Click **Advanced** in the top menu bar and select **Firmware Upgrade**.
4. Click **Select File** in the Firmware Upgrade window and the **Select OS Upgrade File** dialog box opens. Browse to the location of the OS upgrade file (with a .pkt extension) on your hard drive, CD, or floppy drive and click **Open**, then click **Upgrade**. You can monitor the progress in the Firmware Upgrade window.
5. **Upgrade Successful** appears in the Status window when it is complete.
6. Close the Firmware Upgrade window and click the **On Line** button to connect to the DX810.

Important!

Note: Due to software reallocation necessary to provide new features in Version 3.0, files from previous DX810 (DX-10e) versions are not compatible with version 3.0. You will need to create new version 3.0 sessions and manually reload all settings from previous versions.

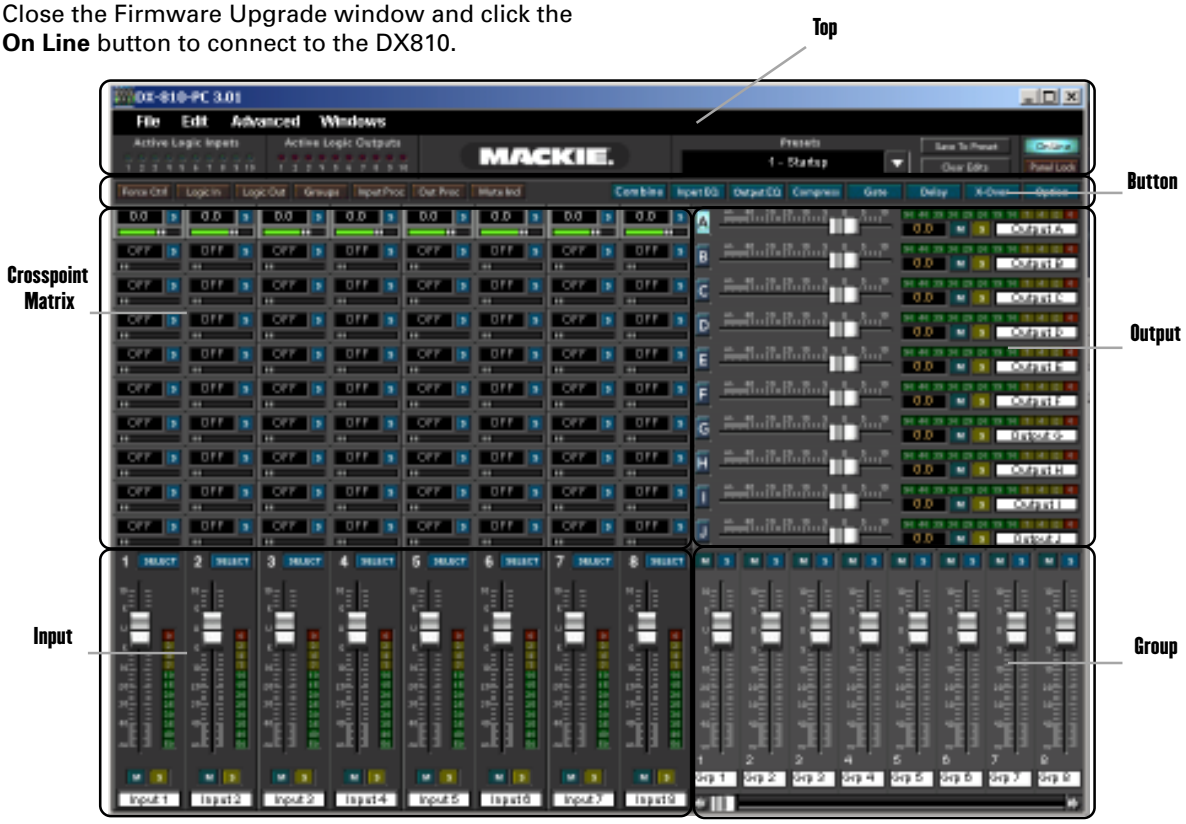
Overview

The DX-810-PC software application provides real time control and configuration editing for the DX810 using a laptop or other PC-compatible computer.

The graphical user interface is divided into six sections:

1. *Top Section*
2. *Button Section*
3. *Crosspoint Matrix Section*
4. *Input Section*
5. *Output Section*
6. *Group Section*

Caution: To adjust a fader, click on the fader knob to select it. Ctrl+click to set the fader to unity. If you click above or below the knob, it will jump to the point where you clicked. This is useful to move the fader quickly to where you want it to be. However, be careful not to inadvertently click above a fader knob. A sudden jump in volume will occur.



Top Section

The Top Section includes the Menu bar, the Active Logic Input and Output indicators, and Preset, On Line, and Panel Lock controls.

Menu Bar

The following menus are available in the Menu bar at the top of the screen:

File

Open (Ctrl+O)

Opens a previously saved session. The Select Workspace File dialog box opens and allows you to select a session to open. Select a file and click Open, or double-click on the file to open it.

When offline, this loads the new settings into the application only, allowing you to edit and save them without being connected to the DX810.

When online, this loads the new settings into the application and the connected DX810, overwriting the existing settings in the DX810.

Caution: *Make sure all downstream power amplifiers and powered speakers from the DX810 are OFF before loading new settings from a file into the DX810.*

Save As

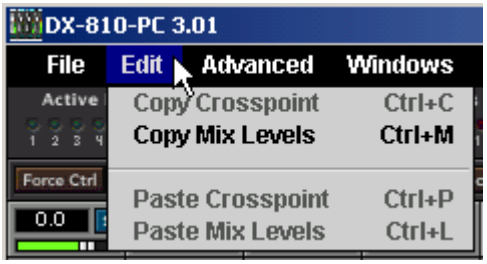
Saves the current session. Use this to save the session when you have made a change to it or to create a new session file. The Save the Session As... dialog box opens and allows you to save the settings under the current session name, or enter a new file name. Enter the new name and click Save.

Note: The extension (.dx8) is automatically appended to the filename. Use up to 20 alphanumeric characters.

Quit (Ctrl+Q)

Closes the DX-810-PC application. The DX810 will continue to operate with the current settings.

Edit



Copy Crosspoint (Ctrl+C)

Copies the gain setting of the selected crosspoint to the clipboard. Click the (S) in the crosspoint box to select it, then select Copy Crosspoint.

Copy Mix Levels (Ctrl+M)

Copies the gain settings of all the inputs for the selected output to the clipboard. Click the associated letter button (A-J) in the Output Section to select an output.

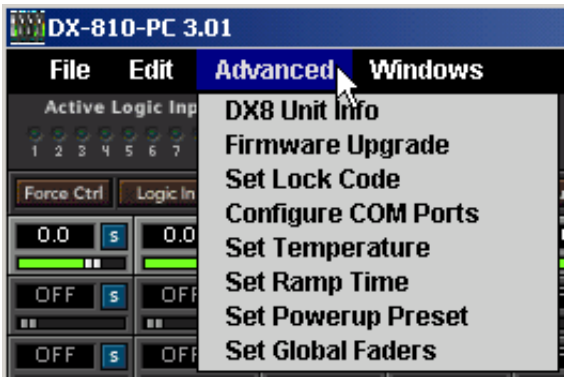
Paste Crosspoint (Ctrl+P)

Pastes the gain setting from the clipboard to the selected crosspoint. Click the (S) in the crosspoint box to select it, then select Paste Crosspoint.

Paste Mix Levels (Ctrl+L)

Pastes the input gain settings from the clipboard to the selected output. Click the associated letter button (A-J) in the Output Section to select an output, then select Paste Mix Levels.

Advanced

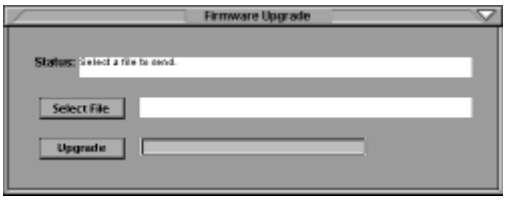


DX810 Unit Info

This opens a dialog box that contains the following information about the DX810 that is currently connected:

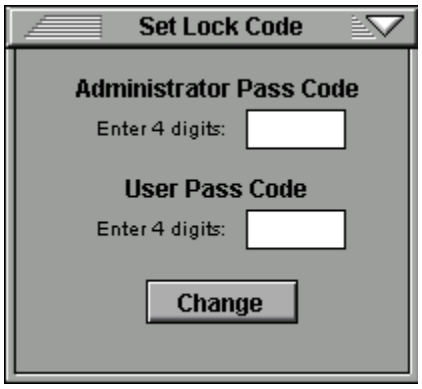
Firmware Upgrade

This allows you to select an OS upgrade file to upload to the DX810 as they become available. Click **Select File** in the Firmware Upgrade window and the **Select OS Upgrade File** dialog box opens. Browse to the location of the OS upgrade file (with a .pkt extension) on your hard drive or floppy drive and click **Open**, then click **Upgrade**. You can monitor the progress in the **Firmware Upgrade** window.



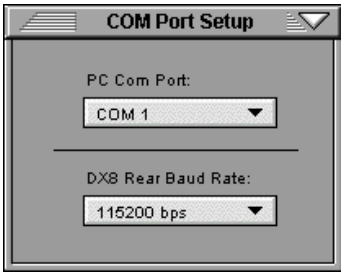
Set Lock Code

Select this to view and change the four-digit Administrator Pass Code or User Pass Code for the DX810. The code must consist of four digits. Use the Panel Lock button in the Top Section to lock and unlock the front panel controls (User level), or use the **MODE** button on the front panel to lock the controls. Refer to page 13 for more information on using the Lock mode and password protection.



Configure COM Ports

The DX–810–PC application uses COM1 on the PC by default. If necessary, you can change the COM port used by the application. Click the **PC Com Port** pull-down box in the **COM Port Setup** window and select the desired COM port.



Note: The DX–810–PC application defaults to COM1 whenever it is restarted. This is regardless of whether another COM port was selected in a previous session. To permanently change the default COM port setting, you must open the file named DX8.ini (located in the System folder where the DX–810–PC application is located) with NotePad. Change the line "dspport:0" to "dspport:1" to change to COM2, "dspport:2" to change to COM3, and so on.

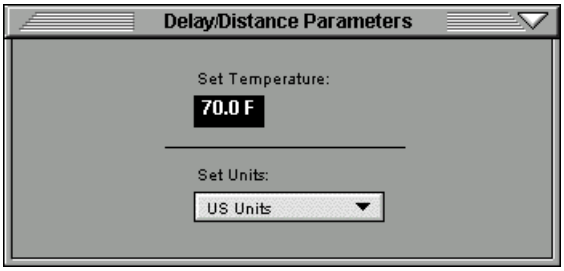
The DX–810–PC application uses 115.2k baud transmission speed for both **COMM PORTS**. Some third-party control systems require a lower baud rate. If using one of these systems, the DX810 rear **COMM PORT** baud rate can be changed in the **COM Port Setup** window. The front panel **COMM PORT** always operates at 115.2k baud.

Note that when the rear **COMM PORT** baud rate is changed from 115.2k baud, the PC application can no longer communicate with the DX810 via this port. You must use the front **COMM PORT** with the PC application in this case.

Set Temperature

Select this to open the **Delay/Distance Parameters** window. The temperature value entered here is used to calculate the delay time in the **Delay Line** output processor (the **Delay** button). The speed of sound varies with air temperature, so it is necessary to enter the ambient air temperature here to calculate the time delay required as a function of distance traveled.

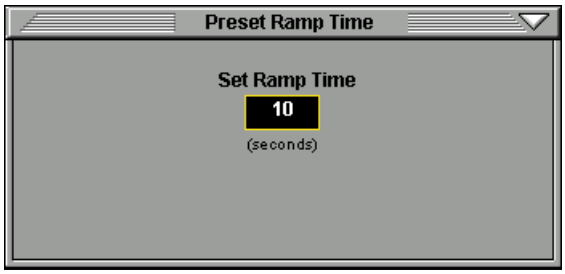
Click and drag up or down in the **Set Temperature** box to change the temperature setting from –40.0° F to 122° F (–40° C to 50° C). Change from Fahrenheit (US Units) to Celsius (Metric) in the **Set Units** box. This also changes the distances in the Delay Line window to Metric.



Set Ramp Time

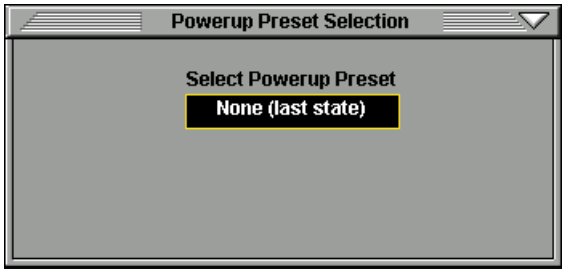
Select this to open the **Preset Ramp Time** window. This controls the transition time for the input, output, and group faders when changing from one preset to another. The range is Off to 30 seconds.

Note: When changing presets, the faders change position quickly on-screen, but the audio actually ramps according to the Ramp Time setting.



Set Powerup Preset

Select this to open the Powerup Preset Selection window. When None (last state) is selected, the DX810 returns to its state when it was last turned off. Click in the Select Powerup Preset box and drag up or down to select one of the 24 presets to load on powerup.



Set Global Faders

Select this to open the Global Output Faders window. Click in the Output Faders are stored: box to choose whether the output fader settings are saved with each preset, or the output fader settings are global and remain at their current settings regardless of the preset selected.

Windows

About

This provides information about the DX–810–PC software application, including the version and personnel credits.

Close Window (Esc)

This closes the window that is currently selected (front-most) on-screen.

Close All (Ctrl+/)

This closes sub-windows that are currently open on the screen, leaving just the main window open.

Combine

This toggles the Combine view with the Crosspoint Matrix view. It duplicates the function of the Combine button in the Button Section.

Input EQ

This toggles the Input EQ window open and closed. It duplicates the function of the Input EQ button in the Button Section.

Output EQ

This toggles the Output EQ window open and closed. It duplicates the function of the Output EQ button in the Button Section.

Compressor

This toggles the Compressor window open and closed. It duplicates the function of the Compress button in the Button Section.

Gate

This toggles the Gate window open and closed. It duplicates the function of the Gate button in the Button Section.

Delay

This toggles the Delay window open and closed. It duplicates the function of the Delay button in the Button Section.

XOver

This toggles the Crossover window open and closed. It duplicates the function of the X-Over button in the Button Section.

Options

The Options window is reserved for future upgrades.

Force Control

This toggles the Force Control window open and closed. It duplicates the function of the Force Ctrl button in the Button Section.

Logic Input

This toggles the Logic Input window open and closed. It duplicates the function of the Logic In button in the Button Section.

Logic Output

This toggles the Logic Output window open and closed. It duplicates the function of the Logic Out button in the Button Section.

Indicators/Presets/Control

Active Logic Inputs

These light to indicate when a logic input is active (e.g., contact closure).

Active Logic Outputs

These light to indicate when a logic output is active.

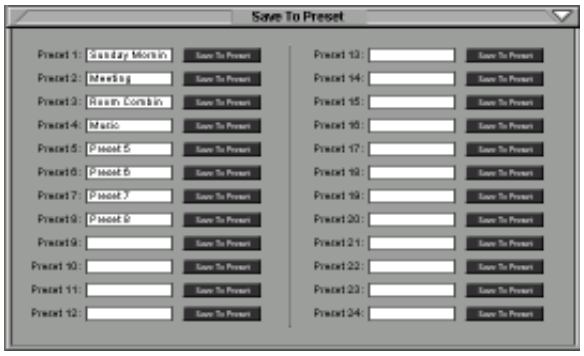
Presets

The DX–810–PC stores up to 24 presets, which can be selected via the Presets pull-down box. Select a preset in the pull-down box and the settings are instantly recalled from memory.

Save To Preset

Click this button to save the current mixer, processor, and group assignment settings to a preset.

The Save To Preset window opens. Enter a name for the preset, then click the Save To Preset button next to it to save it.



Clear Edits

If changes are made to a stored preset, and you want to return to the original settings, click this button. This restores the settings for the currently selected preset.

On Line

Click this button to initiate communication with the DX810. This button lights to indicate when there is active communication between the DX810 and the DX–810–PC application. Click this button again to terminate communication.

Panel Lock

Indicates front panel lock status. Click this button to lock and unlock front panel control. Note that the lock code is not required to use this control. It doesn't affect the PC application's controls.

Button Section

The Button Section includes the assignment buttons (Force Ctrl, Logic In, Logic Out, Groups, Input Proc, Out Proc, Mute Ind) and the DSP buttons (Combine, Input EQ, Output EQ, Compress, Gate, Delay, X-Over).

Assignments

Force Ctrl

Click this button to open the **Force Control** window.

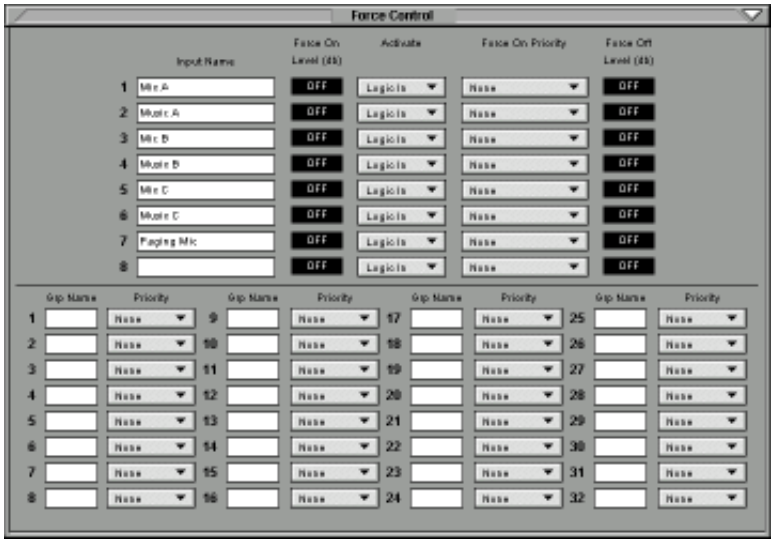
Input Name: Enter a name for each channel with the keyboard. It will accept up to 32 characters.

Force On Level: Assign a force-on level to each input, from OFF to +10 dB. Click and drag in the **Force On Level** box to change the force-on level setting. The force-on action is always relative to the current mix level.

Activate: Choose between Logic In or Gate to activate the Force On or Force Off function. When **Logic In** is selected, an input can be forced on or forced off by configuring the Logic Input window, or by a remote control configured to force on or off an input. When **Gate** is selected, an input can be forced on or forced off when its Gate is open.

Force On Priority: Assign a priority level from 1 (highest) to 8 (lowest) for each channel's force-on function. The default setting is None. A higher priority input can force on or off a lower priority input to its assigned relative force-on or force-off level (see next).

Force Off Level: A force-off level to each input can be adjusted from OFF to +10 dB. Click and drag in the **Force Off Level** box to change the force-off level setting. The force-off action is always relative to the current mix level (e.g., a 0 dB force-off level means the level will not change).



Grp Name: Enter a name for each group with the keyboard. It will accept up to 32 characters.

Priority: Assign a priority level from 1 (highest) to 8 (lowest) for each group. The default setting is None. Assigning priority to groups is useful if you need to have, for example, a paging microphone force off background music in some zones, but not in others. In this case, assign the paging mic input to a Control Group with Priority 1 level, and a Control Group of designated outputs a Priority 2 or lower level. Note that Input Priority and Group Priority are separate functions, and the force-off level for groups is completely off.

Logic In

Click this button to open the **Logic Input** window. Make the following settings and assignments in the **Logic Input** window:

Name: Enter a name for each Logic Input, up to 32 characters.

Function: Select one of 8 different functions in this drop-down box. The functions include Inactive, Force-on, Force-off, Mute Input, Mute Output, Mute Group, Preset Recall, and Combine.

Action: Select whether the particular function selected is momentary, latch on, latch off, or toggling. The selections will vary depending on the function selected for the Logic Input.

Affected I/O: Select the Input, Output, or other parameter that is affected by the Logic function. The selections will vary depending on the function and action selected for the Logic Input.

See Appendix A for a chart of the Logic Input functional combinations available.

Logic Out

Click this button to open the **Logic Output** window. Make the following settings and assignments in the **Logic Output** window:

Name: Enter a name for each Logic Output, up to 32 characters.

Function: Select one of 10 different functions in this drop-down box. These functions include Inactive, Input/Mute Enable, Output Signal Present, Preset Active, Output/Mute Enable, Group/Mute Enable, Force On, Priority Active, Combine Active, and Gate Status.

Parameter: Select the input, output, or other parameter that is monitored by the Logic Output. The selections will vary depending on the function selected for the Logic Output.

Condition: Displays the particular condition that must be satisfied for the Logic Output to become active. The condition will vary depending on the function and parameter selected for the Logic Output.

See Appendix B for a chart of the Logic Output functional combinations available.

Groups

Click this button to view group assignments for crosspoints and outputs. The gain readout boxes change and display the assigned group for the crosspoint or output. This is true of the Crosspoint Matrix and Output Sections.

Tip: If you have an input and output turned up, but you are not hearing the signal in the output, check to see if that input or output (or crosspoint) is assigned to a group by clicking this button. If it is, and the group fader is turned down, you won't get a signal!

Input Proc

Click this button to view the processors (Gate, Compressor, Input EQ) that are active for each input (over the Crosspoint Matrix Section). Lit buttons show processors that are turned on. Click the buttons to turn the processors on and off for each individual input. Ctrl+click on a button to open the processor window and make adjustments.

Out Proc

Click this button to view the processors that are active for each output (over the Crosspoint Matrix Section). These processors include Output EQ, X-Over, Delay, and Compressor. Lit buttons show processors that are turned on. Click the buttons to turn processors on and off for each individual output. Ctrl+click on a button to open the processor window and make adjustments.

Note that if two or more outputs are linked via the Crossover window, only one button appears. This is true of the Output EQ (Graphic or Parametric), X-Over, and Delay output processors, as shown in outputs A through E in the previous output processor view.

Mute Ind

Click this button to view the Active Mute Groups indicator in the upper left corner of the screen. If a group mute button is active, the associated indicator lights up in the Active Mute Group indicator.

DSP

Combine

Click this button to view the Combine buttons, superimposed over the Crosspoint Matrix Section. The combine function allows increased flexibility when providing audio for multiple rooms that need to be reconfigured for different events. Up to sixteen different combinations can be created (C1–C16).

It is important to understand that combining is implemented through control groups. Once you become familiar with this concept, configuring and using the combine feature is actually quite simple.

When using room combining, levels are adjusted through groups, so crosspoints and outputs are assigned to groups. Once this has been set up, use the combine buttons to group outputs in up to 16 combinations. Note that when a "combine" (combination) is active, combining rules overide some settings.

Combine Rules

1. Combining only affects groups. No other controls are affected.
2. When two or more mixes (outputs) are combined:
   a. All crosspoints in a column assigned to a control group will be reassigned to the same control group as the first assigned crosspoint in the same column.
   b. All control groups present in a column of crosspoints will be linked together such that any operation on one control group will affect the others as well.
   c. These two rules (a and b) apply for each crosspoint column in the combined mix, and also for the combined mix outputs.
3. Combining only affects crosspoints and outputs that are assigned to control groups (see rule 1). Any crosspoint or output that is part of a combination, but is not assigned to a control group, will be muted when the combination is inactive, and audible when the combination is active.
4. Multiple combinations can be activated at the same time.
5. Outputs that are not assigned to any combinations are not affected by these rules.

This means that:

• Control groups controlling the outputs to the combined rooms will be linked together. All these control groups will have the same level. The actual output level of each output is the basic level adjusted by this group level. Any of the controls that previously controlled the group level for each output can now adjust the level to all the combined outputs. Mute/enable controls for these groups are also linked.

• Groups that previously controlled the relative level of a single source input to each room will now be linked together to control the relative level of that input to all combined rooms. All the groups for the same input will always have the same level. The actual relative level of the input to each combined output is the basic level to each room adjusted by this group level. Any of the controls that previously controlled the group for the relative level for an input can now adjust the relative level of this input to the combined outputs. Mute/enable controls for these groups are also linked.

• Combining also works with crossover outputs. In this case, as with crosspoints, the crossover looks like a single output for mixing/combining.

Now let's look at an example to see how the rules apply in a practical application.

A Three Room Combination

In this example, Outputs A, B, and C provide separate mixes for three rooms, which are separated by dividing walls that can be folded back to create one large room.

Initial Setup

1. A microphone from Room A is connected to Input 1, a microphone from Room B is connected to Input 2, and a microphone from Room C is connected to Input 3.

2. Input 1 is routed to Output A (Room A) via crosspoint 1A.

3. Input 2 is routed to Output B (Room B) via crosspoint 2B.

4. Input 3 is routed to Output C (Room C) via crosspoint 3C.

So far we have one mic in each room that is routed to its room only. Now set the inputs and outputs to nominal levels appropriate for the gain structure of the system.

Secondary Setup for Room Combining

We want to be able to fold the walls back and combine rooms A and B, rooms B and C, or combine all three rooms into one large room. We will create two combinations: C1 will combine rooms A and B, and C2 will combine rooms B and C. To combine all three rooms, activate both C1 and C2.

5. Assign each output A, B, and C to its own control group. Let's use groups 1, 2, and 3.

6. Assign each crosspoint to its own control group. For this example, let's use the following:

Crosspoint	Group
1A	4
2B	5
3C	6

Tip: Don't forget to deselect the group select button when you are finished assigning the outputs and crosspoints to the groups! You can click the Group button to verify that you have assigned the outputs and crosspoints correctly.

7. Set the group levels to a nominal level (or unity gain).

Now we have assigned each crosspoint and output to a control group, to satisfy one of the combine rules (rule number 1).

Next we will add the inputs that we want to appear at each output when each combination is active.

8. Select Output A and adjust crosspoints 2A and 3A so they can be heard in Output A. This puts Room B and Room C mics into Room A output.

9. Select Output B and adjust crosspoints 1B and 3B so they can be heard in Output B. This puts Room A and Room C mics into Room B output.

10. Select Output C and adjust crosspoints 1C and 2C so they can be heard in Output C. This puts Room A and Room B mics into Room C output.

Notice that we haven't assigned these crosspoints to groups. This ensures that the extra inputs added to each output will only be heard when the combination is active (rule number 3). Note that the added inputs can be heard in all the outputs until the combination is created, activated, and then deactivated. That is when the combine rules take effect.

Assign Combinations

Now we'll create the combination to allow the inputs for rooms A and B to be heard in both A and B outputs when C1 is active.

11. Open the combine view by clicking on the Combine button.

Tip: Each row of combine buttons (C1-C16) is associated with the output at the end of the row. There is no association with the inputs or input faders at the bottom (vertically). Each output can be assigned to none, one, or more combinations. The last row of reddish colored combine buttons are used to activate individual combinations.

12. Create Combination 1 by clicking on C1 for Outputs A and B.

13. Click on C1 in the last row of reddish combine buttons to activate Combination 1.

Now Mics 1 and 2 room will be heard in rooms A and B outputs.

- Groups 1 and 2 are linked and control the output level into A and B outputs.
- Group 4 controls the volume of mic #1 into A and B outputs.
- Group 5 controls the volume of mic #2 into A and B outputs.

Note: All the control group faders adjust the volume levels relative to the individual output and crosspoint level settings made previously.

Next we'll create the combination to allow the inputs for rooms B and C to be heard in both B and C outputs when C2 is active.

14. Open the combine view by clicking on the Combine button.

15. Click on C1 to deactivate Combination 1.

16. Create Combination 2 by clicking on C2 for Outputs B and C.

17. Click on C2 in the last row of reddish combine buttons to activate Combination 2.

Now Mics 2 and 3 will be heard in both rooms B and C outputs.

• Groups 2 and 3 are linked and control the output level into B and C outputs.

• Group 5 controls the volume of mic #2 into B and C outputs.

• Group 6 controls the volume of mic #3 into B and C outputs.

18. Finally, activate both C1 and C2, and all three inputs can be heard in all three outputs.

• Groups 1, 2, and 3 are linked and control the output level into A, B, and C outputs.

• Group 4 controls the volume of mic #1 into all three outputs.

• Group 5 controls the volume of mic #2 into all three outputs.

• Group 6 controls the volume of mic #3 into all three outputs.

Input EQ

Click this button to view the Input 3-band EQ controls, superimposed over the Crosspoint Matrix Section.

Each input strip has a 3-band EQ comprised of:

1. A high-frequency shelving EQ with adjustable gain (±15 dB) and frequency (500 Hz–20 kHz).
2. A mid-frequency parametric EQ with adjustable gain (±15 dB), frequency (20 Hz–20 kHz), and bandwidth (0.1–6.0 octaves).
3. A low-frequency shelving EQ with adjustable gain (±15 dB) and frequency (20 Hz–500 Hz).
4. An ON button to turn the EQ on and off.

Click and drag up and down on the control knob to change the setting.

Note: You can not directly enter a numeric value with the mouse and keyboard. The EQ settings apply to all the outputs to which the input is assigned.

Use the arrow keys on the keyboard to make fine adjustments to a selected control, and the Page Up/Down keys to make course adjustments. Use the Tab key to quickly move the selection to adjacent controls.

Output EQ

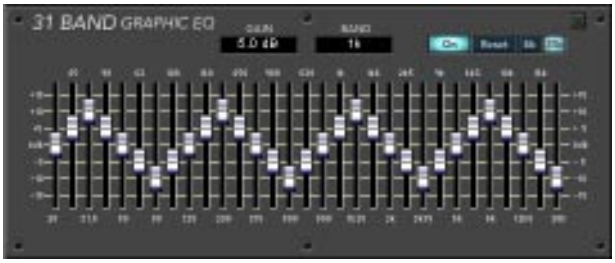
Click this button to view the Output EQ controls. Click the output letter buttons (A-J) to select an output after the Output EQ window is open.

Select either a 31-band Graphic EQ or an 8-band Parametric EQ.

Note: When switching between the 31-band Graphic EQ and the 8-band Parametric EQ, a warning will appear: "This will reset all EQ parameters!" Click Cancel to retain the current EQ settings, or OK to change EQ modules.

31-band Graphic EQ

With an output selected, click the 31b button to view the Graphic EQ controls.



Click the On button to activate the Graphic EQ for the selected output. The Reset button returns all the sliders to their center (0 dB) positions.

Each band is on an ISO center frequency ranging from 20 Hz to 20 kHz, with ±15 dB gain on each band.

Click and drag on a slider knob to adjust the EQ. Use the arrow keys on the keyboard to make fine adjustments to a selected control. Use the Page Up/Down keys to make course adjustments. The selected band's GAIN and BAND (frequency) are displayed at the top of the window.

Click the right mouse button over the processor display. This brings up a menu allowing you to cut, copy, or paste the processor settings to another output.

8-band Parametric EQ

With an output selected, click the 8b button to view the 8-band Parametric EQ controls.

Click the On button to activate the Parametric EQ for the selected output. The Reset button returns all the controls to their center positions.

Each band has adjustable gain (±15 dB), frequency (20 Hz–20 kHz), and bandwidth (0.1–6.0 octaves).

Click the right mouse button over the processor display. This brings up a menu allowing you to cut, copy, or paste the processor settings to another output.

Compress

Click this button to view the Compressor for a selected input or output. Click an input SELECT button to select an input. Click the output letter buttons (A-J) to select an output.

Click the On button to activate the Compressor for the selected input or output. The Reset button returns all the controls to their default positions.

The Compressor has five knobs: Attack, Release, Output, Threshold, and Ratio. Click and drag on the individual knobs to adjust each parameter. An analog-style meter indicates the amount of compression applied in decibels.

Click the right mouse button over the processor display. This brings up a menu allowing you to cut, copy, or paste the processor settings to another channel.

About Compression:

A compressor is used to reduce or limit transient peaks in a signal. As the input level to the compressor increases, the output level increases linearly until the threshold point is reached. After that point, the output level no longer increases linearly. Instead, it increases at a reduced rate determined by the ratio setting.

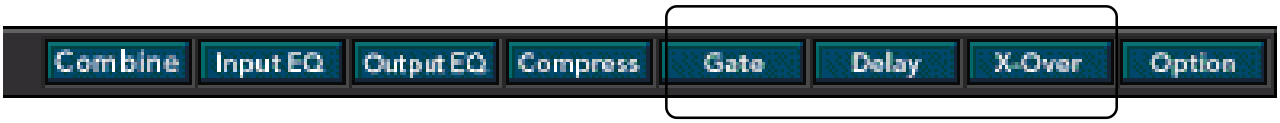
This compressor features 'soft-knee' compression. As the input signal level approaches and crosses the threshold, the compressor gradually starts compressing. The compression ratio gradually increases to the required setting smoothly.

- *Threshold:* This control determines the level around which the compressor begins to act on the incoming signal. It is calibrated in decibels, with a range from –60.0 dBFS to –1.0 dBFS.
- *Attack:* This determines how fast the compressor reacts once the threshold has been exceeded. It is calibrated in milliseconds, with a range from 0.1 ms to 2500 ms (2.5 seconds) per 20 dB of gain change.
- *Release:* This determines how fast the compressor turns off once the signal falls below the threshold. It is calibrated in milliseconds, with a range from 10 ms to 2500 ms (2.5 seconds) per 20 dB of gain change.
- *Ratio:* This determines the change in output level. It is a function of the change in input level (at full compression), once the threshold has been fully exceeded. It is calibrated in decibels, with a range from 1.0:1 (off) to 20:1. Thus, if it is set to 10:1, an increase in input level of 10 dB results in a 1 dB increase in output level. This assumes the input is above the threshold level.

  Generally, use ratio settings from 1.5:1 to 5.0:1 for compressor use. Settings from 10:1 to 20:1 are more useful for limiting purposes. This is because in that range the output level changes very little as the input increases.
- *Output:* This determines the overall gain of the compressor from input to output (as measured with the signal below the threshold level). You can use this control to compensate for the loss of gain caused by the action of the compressor. It is calibrated in decibels, with a range from 0 dB (unity) to +20.0 dB.

Gate

Click this button to view the Gate for a selected input. Click an input SELECT button to select an input.



Click the **On** button to activate the Gate for the selected input. The **Reset** button returns all the knobs to their default settings.

The Gate has four knobs: **Hold, Release, Threshold**, and **Range**. Click and drag on the individual knobs to adjust each parameter. An analog-style meter indicates the input signal level for the selected channel.

Click the right mouse button over the processor display to bring up a menu that allows you to cut, copy, or paste the processor settings to another channel.

About Gating:

A gate is used to duck or mute a channel when the signal level drops below a certain point. This can reduce the overall noise level in your mix by muting unused or noisy channels.

Note: When we say the gate opens, it means the gate is not acting on the signal and the signal is allowed to pass. When the gate closes, the gate acts on the signal by attenuating it.

- *Threshold:* This determines the level below which the gate closes (and above which it opens). It is calibrated in decibels, ranging from –60 dBFS to –1 dBFS.
- *Hold:* This determines how long the gate remains open after the input signal has fallen below, and remains below, the threshold before closing. It is calibrated in milliseconds, ranging from 0 ms to 2550 ms (2.55 sec).
- *Release:* This determines how fast the gate closes after the hold time has expired. It is calibrated in milliseconds, ranging from 10 ms to 2500 ms (2.5 sec) per 20 dB of gain change.
- *Range:* This determines the amount of attenuation of the input signal when the gate is closed. It is calibrated in decibels, ranging from –100 dB to –1 dB.

Delay

Click this button to view the Delay settings for a selected output. Click the output letter buttons (**A-J**) to select an output.

Click the **On** button to activate the Delay Line.

The Delay Line has two knobs: **Coarse**, and **Fine**. Click and drag on the individual knobs to adjust each parameter.

Coarse: This control adjusts the delay in 1 millisecond increments, with a range from 0 ms to 200 ms. The equivalent distance the sound travels in the selected amount of time is displayed. Use this control when setting up a delay between two speakers, as in a delay tower.

Fine: This control adjusts the delay in small increments (22.7 µs), with a range from 0 µs to 997 µs. The equivalent distance the sound travels in the selected amount of time is displayed. Use this control to adjust for offsets between drivers in a stack. For example, use this control to time-align a horn's compression driver and a woofer's voice coil.

In addition, it is necessary to enter the ambient air temperature in the **Delay/Distance Parameters** window (click **Advanced** in the top menu bar and select **Set Temperature**). The speed of sound varies with air temperature, and this value is needed to accurately calculate the time delay required as a function of distance traveled (see "Set Temperature" on page 16). You can also choose between US units (Fahrenheit/Feet/Inches) and Metric units (Celsius/Meters/Millimeters) in the **Delay/Distance Parameters** window.

Click the right mouse button over the processor display. This brings up a menu allowing you to cut, copy, or paste the processor settings to another channel.

X-Over

Click this button to view the 1 to 5-Band Crossover. The crossover window has a graphic display to indicate the number of bands and crossover points selected. Up to five outputs can be selected, which become linked to a single row of inputs. In other words, each of the eight inputs has just one mix level to the combined outputs in the crossover. This is reflected in the Crosspoint Matrix Section by "blanking out" all but the top row of crosspoints for the linked crossover outputs. Note that only contiguous outputs may be linked to create a crossover.

Linking outputs together for the crossover automatically links those outputs in Output EQ processors. The Output EQ defaults to the setting for the first output in the crossover (i.e., Output A). The equalizers are located prior to the crossover in the signal chain, so all the outputs assigned to the crossover are affected by the EQ settings.

With the first band active (red active button lit), click the On button to turn the crossover on and off. When the crossover is turned off, all the outputs assigned to the crossover pass a full-range signal. Click the Reset button to return all the knobs for the currently active band to their default settings.

Output: Select the first output for the crossover (A-J). Click the arrow next to the box to select an output in the pull-down list. It appears in the first Output box. Repeat for up to five bands in a single crossover system.

To deselect an output once you've selected one, click the arrow next to the box and select the "blank" line under the J output. This removes the output selection from the crossover.

Polarity: The Polarity button reverses the polarity of the output by 180°.

Edit: Click the Active button under Edit to adjust the settings for the selected output. Then use the Filter Type, Filter Slope, Alignment, Frequency, and Delay Time controls.

Filter Type: Use this control to select high-pass (HP), low-pass (LP), or band-pass (BP) filters for the selected output. Notice that the Frequency control selection changes to High Freq and Low Freq when BP is selected.

Filter Slope: Use this control to choose the roll-off curve for the frequencies above or below the cutoff frequency. When Butterworth or Bessel alignment is selected, 12, 18, and 24 dB/octave slopes are available. When Linkwitz-Riley is selected, 12 and 24 dB/octave are available (18 dB can't be selected).

Alignment: This switch selects either Linkwitz-Riley, Butterworth, or Bessel characteristics for the selected Filter Type.

Frequency: This selects the cutoff frequency for the selected filter, with a range from 20 Hz to 20 kHz. When a bandpass filter is selected, High Freq and Low Freq controls are available.

Delay Time: This control adjusts the delay for the selected output in small increments (22.7 µs), with a range from 0 µs to 997 µs. The equivalent distance the sound travels in the selected amount of time is displayed.

Note: This control is provided in the Crossover window because the Delay Line DSP (the Delay button) is situated prior to the crossover in the signal chain. When the crossover is active, use this delay control to adjust for offsets between drivers in a stack. For example, use this control to time-align a horn's compression driver and a woofer's voice coil.

Option

This button is reserved for future upgrades.

Crosspoint Matrix Section

This section provides a view of all the input-to-output crosspoints in the mixing matrix. It has a numerical and graphical indication of the gain setting for each crosspoint.

Click the associated letter button (A-J) in the Output Section to select an output and the horizontal row of input crosspoints is highlighted. The input faders in the Input Section now control the gain settings and mix for the selected output. Either click on the fader or click on the horizontal mini-fader indicator bar in the crosspoint to adjust the gain for the input.

Click the select (S) button to select the crosspoint for copying or pasting the level. Otherwise, when a group is selected, use it to assign the crosspoint to the selected group.

Input Section

This section includes the eight input faders along with their associated bargraph input level meters, Select and Mute buttons, and name box.

The fader adjusts the mix level from the input to the output selected in the Crosspoint Matrix Section (indicated by the highlighted row). The numerical display for the level is shown at the crosspoint in the Crosspoint Matrix section. Use the arrow keys on the keyboard to make fine adjustments to the level. Use the Page Up/Down keys to make course adjustments.

The input level meter indicates the level of the input signal as it comes out of the analog to digital converters and shows the level in dBFS. If the red 0 dB portion is lit, then the signal level is above –2 dBFS and close to clipping. Note that the meter indicates the signal level before any processing or digital gain stages. If the signal is clipping, or is too low, adjust the signal level at the source, or use the trim controls on the rear panel of the DX810.

When a group is selected, click the SELECT button to assign the input to the selected group. The assigned group fader then affects the signal level for that input to all ten outputs. Click the SELECT button when the gate or compressor windows are showing to adjust the processing options for that input.

Click the mute (M) button to mute the input signal to all ten outputs.

Ctrl+click the (M) button to engage the enable function. The blue (M) button changes to a gray (E) to indicate the enable function is active. This mutes the input signal normally, and unmutes it when the enable button is active. Ctrl-click the enable (E) button to change back to the mute function.

Note: When the enable function is engaged, logic inputs, outputs, and remotes that are programmed to activate/deactivate/indicate the mute function now control (or are controlled by) the enable function.

Click the solo (S) button to isolate the input signal in the mix. When an input solo button is engaged, the remaining inputs are automatically muted. This is useful for troubleshooting and listening to each input individually.

Use the name box at the bottom of the Input Section to enter a name for the input (e.g., CD Left, CD Right, Vocal, Guitar, etc.), up to 32 characters.

Output Section

The Output Section includes the ten output faders along with their associated bargraph output level meters. This section also includes numerical gain display, mute and solo buttons, and name box.

Use the output faders to adjust the final output level of the signal. Adjust the output faders so that the associated output meter indicates around the –10 and –7 dB positions when a normal signal is going to that output. This provides the best signal-to-noise ratio for the output stage. It is okay for the –4 and –2 LEDs to blink occasionally on musical peaks. However, avoid allowing the red 0 dB indicator to light, which indicates that the signal is within 2 dB of clipping.

Note that the meter indicates the signal level after the output signal processing (i.e., Graphic EQ or Parametric EQ, Compressor, Crossover). If adjustments are made to the output processors, the output fader may need to be readjusted. This is to compensate for an increase or decrease in gain through the processors.

Click the mute (M) button to mute the output signal.

Ctrl+click the (M) button to engage the enable (E) function. This mutes the output signal normally, and unmutes it when the enable button is on (active). Ctrl+click the enable (E) button to change back to the mute function.

Note: When the enable function is engaged, logic inputs, outputs, and remotes that are programmed to activate/deactivate/indicate the mute function now control (or are controlled by) the enable function.

Click the (S) button to solo the output. This mutes all the outputs except the soloed output. This is useful for troubleshooting and listening to each output individually.

Click the letter button (A-J) when a group is selected to assign the output to the selected group. Click the letter button when a processing window is showing (except Gate and Input EQ) to adjust the processing options for that output.

Use the box to the right of the Output Section to enter a name for the output (e.g., Main Left, Control R), using up to 32 characters.

Group Section

This section includes the 32 control groups. Eight groups are displayed at one time. However, the horizontal fader at the bottom allows you to scroll through all the control groups.

There is a mute and select button associated with each Control Group.

To assign or unassign a crosspoint or output to a group:

1. Click the select (S) button for the desired group. If any crosspoints or outputs are assigned to the selected group, their select buttons light.
2. Click the select (S) button for the crosspoints you want to assign to the selected group. The group fader affects the mix level for each crosspoint to a single output.
3. Click the SELECT button in the Input Section to assign the input fader to the selected group. The group fader affects the mix level for each input to all the outputs.
4. Click the associated letter button (A-J) in the Output Section to assign an output to the selected group. The group fader affects a single output level.
5. Click the Groups button in the Top Section to view and verify group assignments.

Group assignments are saved in each preset. This allows different combinations of crosspoints, inputs, and outputs to be assigned to the same group number in separate presets.

Click the (**M**) button to mute the group. This mutes all crosspoints, inputs, and outputs assigned to the group. Click the **Mute Ind** button to view the **Active Mute Groups** indicator.

Ctrl+click the (**M**) button to engage the enable (**E**) function. This mutes the group normally, and unmutes it when the enable button is on (active). Ctrl+click the enable (**E**) button to change back to the mute function.

Exclusive Enable Program Selection

Control Groups can be enabled exclusively; that is, when one group is enabled, other groups are automatically disabled so that only one group is active at a time. Use this feature to configure a zone so that one input at a time can be selected in the mix. Up to eight programs (inputs) can be selected individually in a room using two DX-SW4 remote control units configured to select (force on) groups.

To configure groups for Exclusive Enable:

1. For this example, use Groups 1-4. Ctrl+click the (M) button on Groups 1-4 to engage the enable function. The (M) will change to an (E).
2. Click the select button (S) for the first group. For this example, use Groups 1-4.
3. Ctrl+click the select button for the second group. The button will start blinking.
4. Ctrl+click the select button for the remaining groups (3-4) that you want to associate with the exclusive enable function.
5. Click the select button for the first group to turn it off. The other three select buttons stop blinking.
6. Click the select button for the second group.
7. Ctrl+click the select buttons for the first, third, and fourth groups.
8. Click the select button for the second group to turn it off.
9. Click the select button for the third group, and Ctrl+click the select buttons for the first, second, and fourth groups. Click the select button for the third group to turn it off.
10. Click the select button for the fourth group, and Ctrl+click the select buttons for the first, second, and third groups. Click the select button for the fourth group to turn it off.

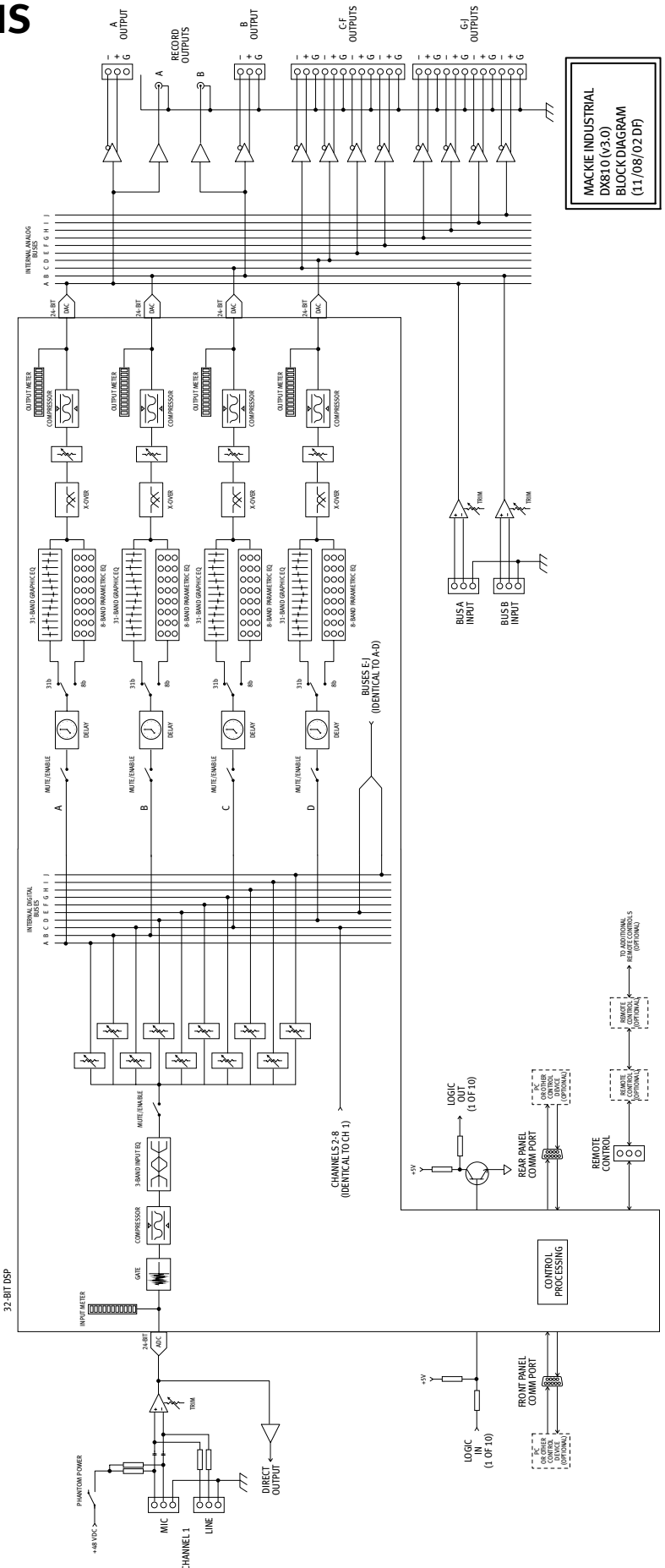
Now when you click on the enable buttons for Groups 1-4, only one at a time can be selected.

The group fader controls the relative level for all the crosspoints, inputs, and outputs assigned to it. At the unity gain position (**U**), all the levels are at their assigned values and the group fader has no effect. Reduce the group fader 10 dB, and all the levels assigned to that group are reduced 10 dB, relative to their assigned value. Note that the group fader can increase the level 10 dB. However, if an assigned level is already at +10 dB, it will not change. The maximum overall gain available for any crosspoint, input, or output is +10 dB.

Use the box at the bottom of the Group Section to enter a name for the group (e.g., Voc, Drum), using up to 32 characters.

6. SPECIFICATIONS

DX810 Block Diagram



DX810 Specifications

INPUTS / OUTPUTS

Inputs 1-8: Balanced, Phoenix-type terminals

Bus A and B: Balanced, Phoenix-type terminals, Direct to Mix Buses

Outputs A-J: Balanced, Phoenix-type terminals

Record Outputs A/B: Unbalanced, RCA

Direct Outputs 1-10: Unbalanced on DB15
(bottom row is signal return)

Logic Inputs: 10 Inputs on DB25
Series resistance: 570Ω
Internal pull-up: 47 kΩ to +5 VDC
Input voltage: +5.5 VDC maximum
Active voltage: +1.0 VDC maximum

Logic Outputs: 10 open-collector Outputs on DB25
Series resistance: 550 Ω
Internal pull-up: 10 kΩ to +5 VDC
Active current: 10 mA maximum
Active voltage: +0.8 VDC max @ 1 mA

Serial Ports: 2 RS-232C on DB9 (COMM PORTS)

PANEL CONTROLS

Input Trim: 8 Rotary Potentiometers

Input Gain: 2 Pushbuttons per Input

EQ: 2 Pushbuttons for Low, 2 for High

Master Output Gain: 2 Pushbuttons per Output

Mode Select: 1 Pushbutton

Power: Rocker Switch

Phantom Power Select: 8 DIP Switches

PANEL INDICATORS

Input Levels: 12-segment LEDs per ch.

Output EQ Levels: 12-segment LEDs per ch.

Mode Status: 3 LEDs; A/B/LOCK

Output Levels: 12-segment LEDs per ch.

Volume Setting: 12-segment LED Bar Graph

LED METER VALUES

1. Red (scale: OL): > –2 dB full-scale (> 16 dBu)
2. Yellow (scale: 2): > –4 dB full-scale (> 14 dBu)
3. Yellow (scale: 4): > –7 dB full-scale (> 11 dBu)
4. Yellow (scale: 7): > –10 dB full-scale (> 8 dBu)
5. Green (scale: 10): > –15 dB full-scale (> 3 dBu)
6. Green (scale: 15): > –20 dB full-scale (> –2 dBu)
7. Green (scale: 20): > –25 dB full-scale (> –7 dBu)
8. Green (scale: 25): > –30 dB full-scale (> –12 dBu)
9. Green (scale: 30): > –35 dB full-scale (> –17 dBu)
10. Green (scale: 35): > –40 dB full-scale (> –22 dBu)
11. Green (scale: 40): > –50 dB full-scale (> –32 dBu)
12. Green (scale: 50): > –60 dB full-scale (> –42 dBu)

SIGNAL PROCESSING

General: Five 32-bit floating-point DSPs
24-bit A/D and D/A converters
512Kx16 Flash ROM
128Kx32 SRAM (with battery backup)

Inputs: 3-band shelving EQ with parametric mid
Gain: ±15 dB
Corner Frequency:
LO: 20 Hz-500 Hz variable
HI: 500 Hz-20 kHz variable
Center Frequency:
MID: 20 Hz-20 kHz variable

Gate on each Input
Threshold: –60 dBFS to –1 dBFS
Hold: 0 ms to 2500 ms
Release: 10 ms to 2500 ms
Range: –100 dB to –1 dB

Outputs: Delay on each Output
Temp: –40°F to 122°F
(40°C to 50°C)
Coarse: 0 ms to 200 ms
Fine: 0 µs to 997 µs

Crossover
Polarity: 0°, 180°
Filter Type: High-Pass, Low-Pass, Band-Pass
Alignment: Linkwitz-Riley, Butterworth, Bessel
Filter Slope: 12 dB/oct, 18 dB/oct, 24 dB/oct (Butterworth only)
Frequency: 20 Hz-20 kHz

1/3-Octave Graphic EQ on each Output
Gain: ±15 dB
ISO-Centered Frequencies: 20, 25, 31.5, 40, 50, 63, 80, 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1 k, 1.25 k, 1.6 k, 2 k, 2.5 k, 3.15 k, 4 k, 5 k, 6.3 k, 8 k, 10 k, 12.5 k, 16 k, 20 k

8-Band Parametric EQ on each Output
Gain: ±15 dB
Center Frequency:
20 Hz-20 kHz variable
Bandwidth: 0.1 octave to 6 octaves

Compressor/Limiter on each Input and Output
Threshold: –60.0 dB to –1.0 dB
Attack: 1 ms to 2500 ms
Release: 10 ms to 2500 ms
Ratio: 1:1 to 20:1
Output: 0 dB to +20.0 dB

Audio

Noise
(20 Hz-20 kHz bandwidth, Master Out, channel Trims @ unity gain, channel EQs flat, all odd channels panned left, even channels panned right):

Master level @ unity, channel levels @ unity:	–82 dBu
Single channel to Master Out:	–100 dBu
	(referenced to 1% THD+N)

Total Harmonic Distortion (THD+N)
(1 kHz @ +10 dBu (unity level) 20 Hz-20 kHz):

Mic in to Master Out:	< 0.005%

Crosstalk
(1 kHz relative to 0 dBu, 20 Hz-20 kHz bandwidth, any line input to adjacent Direct Out):

Trim to unity:	< –90 dB

Frequency Response

Mic input to any output:	20 Hz–20 kHz, ±0.5 dB

Equivalent Input Noise (EIN)
Mic in to Direct out, max gain, 150 ohm termination:
–129.5 dBm unweighted

Common Mode Rejection (CMR)
Mic in to Direct out, max gain, 1 kHz signal: better than 80 dB

Maximum and Nominal Levels and Ranges

Mic inputs:	+18 dBu, +4 dBu, 0 to 60 dB gain
Line inputs:	+18 dBu, +4 dBu, –30 to +30 dB gain
Bus A/B inputs:	+18 dBu, +4 dBu, –20 to +20 dB gain
All outputs:	+18 dBu, +4 dBu

Impedances

Mic inputs:	1.3K ohms
Line inputs:	40K ohms
All other inputs:	10K ohms or greater
All outputs:	120 ohms

PHYSICAL

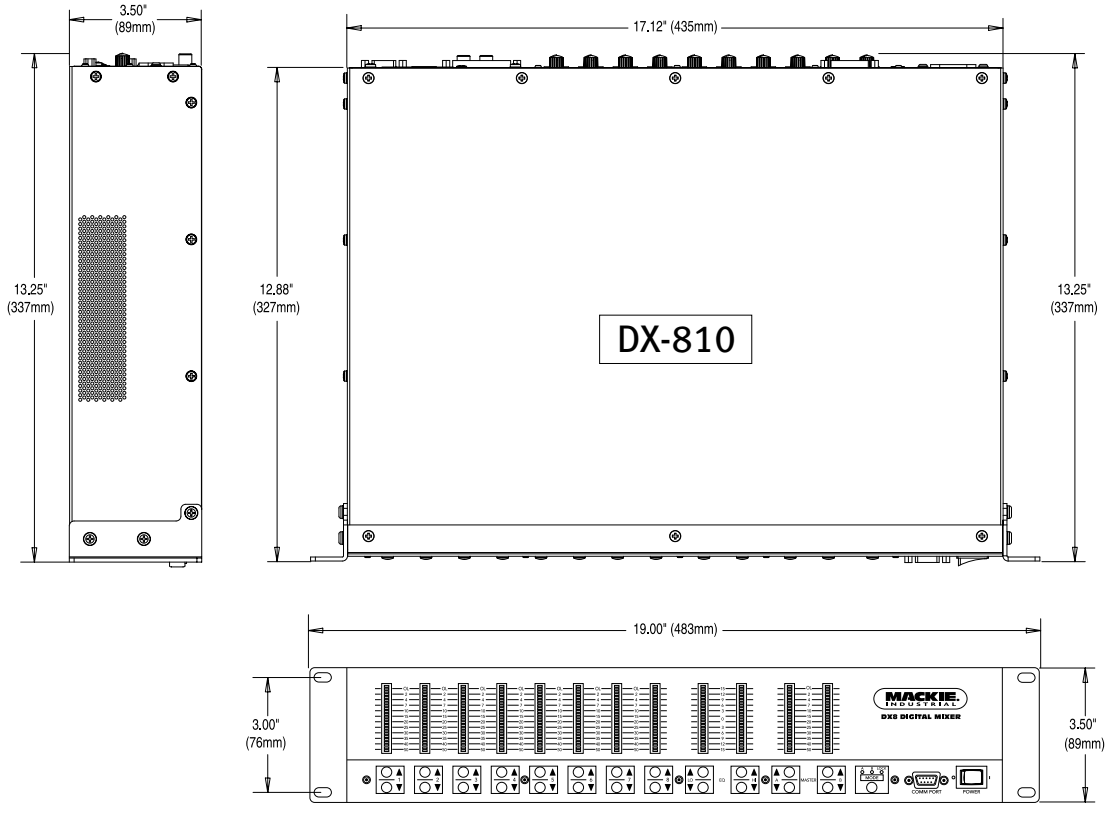
Dimensions (HxWxD):	3.5"/2 RU (89mm) x 19" (483mm) x 13.25" (337mm)
Net Weight:	12.9 lbs. (5.9 kg)

ELECTRICAL

AC Power:	90–240 VAC, 50/60 Hz, 1.0 A
DC Power:	24 VDC, 3 A
Phantom Power:	+48 VDC, current limited to 7 mA per input channel
Fuse Ratings:	1.6 A Slo Blo, 250 V

PC SYSTEM REQUIREMENTS

OS:	Windows® 95, 98, NT®, 2000, XP
Processor:	Pentium® or faster
RAM:	16 MB minimum 32 MB recommended
Storage:	10 MB free disk space
Display:	800x600 pixels, 256 colors minimum



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7. SERVICE INFORMATION

In the event that your DX810 should require servicing, please follow these instructions:

1. Call Mackie Tech Support at 1-888-337-7404, 8 am to 5 pm PST (Monday-Friday). Verify the problem and obtain a Return Authorization (RA) Number. Be sure to have the serial number of the unit when you call. You must have a Return Authorization Number in order to obtain warranty service at the factory or at an authorized service center.
2. Pack the unit in its original packaging. *This is very important.* Mackie Industrial is not responsible for any damage that occurs during shipping due to non-conventional packaging. Original packaging helps to minimize the possibility of shipping damage.
3. Include a legible note stating your name, return shipping address (no P.O. boxes), daytime phone number, and Return Authorization Number. Give us a detailed description of the problem, including how we can duplicate it.
4. Write the Return Authorization Number in BIG BOLD PRINT on the top of the box.
5. Ship the unit to us. We suggest insurance for all forms of cartage. Ship to this address:

Mackie Designs
Service Department
16140 Wood-Red Road NE, Suite 5
Woodinville, WA 98072

Appendix A: Logic Input Functions

Logic Input Function	Action	Affected I/O
Inactive	None	None
Force-On	Momentary	Input 1-8; Group 1-32
	Latch On	Input 1-8; Group 1-32
	Latch Off	Input 1-8; Group 1-32
	Toggling	Input 1-8; Group 1-32
Force-Off	Momentary	Input 1-8; Group 1-32
	Latch On	Input 1-8; Group 1-32
	Latch Off	Input 1-8; Group 1-32
	Toggling	Input 1-8; Group 1-32
Mute/Enable Input	Momentary	Input 1 to Input 8
	Latch On	Input 1 to Input 8
	Latch Off	Input 1 to Input 8
	Toggling	Input 1 to Input 8
Mute/Enable Output	Momentary	Output A to J
	Latch On	Output A to J
	Latch Off	Output A to J
	Toggling	Output A to J
Mute/Enable Group	Momentary	Group 1 to Group 32
	Latch On	Group 1 to Group 32
	Latch Off	Group 1 to Group 32
	Toggling	Group 1 to Group 32
Preset Recall	Momentary	Preset 1 to Preset 24
	Latch On	Preset 1 to Preset 24
Combine	Momentary	Combine 1 to Combine 16
	Latch On	Combine 1 to Combine 16
	Latch Off	Combine 1 to Combine 16
	Toggling	Combine 1 to Combine 16

Appendix B: Logic Output Functions

Logic Output Function	Parameter	Condition
Inactive	None	None
Inp Mute/Enable	Input 1-8	Input Muted or Enabled
Out Sig Present	Output A-J	Output A Signal > –40 dB
Preset Active	Preset 1-24	Preset Active
Out Mute/Enable	Output A-J	Output Muted or Enabled
Group Mute/Enable	Group 1-32	Group Muted or Enabled
Force On	Input 1-8; Group 1-32	Force On Active
Priority Active	Input Priority 1-8; Group Priority 1-8	Priority Active
Combine Active	Combine 1-16	Combine Active
Gate Status	Input 1-8	Gate Open

Appendix C: Selection Remote Predefined Functions

DX-SW4 Remote Switch Control (4-button/4-LED) for DX-810 v3.01 (Firmware v7.00)						
ID	Switch Positions 1 through 8	Function	Control 1	Control 2	Control 3	Control 4
0	00000000	Mute Input 1-4	Mute Input 1	Mute Input 2	Mute Input 3	Mute Input 4
1	10000000	Mute Input 5-8	Mute Input 5	Mute Input 6	Mute Input 7	Mute Input 8
2	01000000	Mute Output A-D	Mute Output A	Mute Output B	Mute Output C	Mute Output D
3	11000000	Mute Output E-H	Mute Output E	Mute Output F	Mute Output G	Mute Output H
4	00100000	Mute Output G-J	Mute Output G	Mute Output H	Mute Output I	Mute Output J
5	10100000	Mute Group 1-4	Mute Group 1	Mute Group 2	Mute Group 3	Mute Group 4
6	01100000	Mute Group 5-8	Mute Group 5	Mute Group 6	Mute Group 7	Mute Group 8
7	11100000	Mute Group 9-12	Mute Group 9	Mute Group 10	Mute Group 11	Mute Group 12
8	00010000	Mute Group 13-16	Mute Group 13	Mute Group 14	Mute Group 15	Mute Group 16
9	10010000	Mute Group 17-20	Mute Group 17	Mute Group 18	Mute Group 19	Mute Group 20
10	01010000	Mute Group 21-24	Mute Group 21	Mute Group 22	Mute Group 23	Mute Group 24
11	11010000	Mute Group 25-28	Mute Group 25	Mute Group 26	Mute Group 27	Mute Group 28
12	00110000	Mute Group 29-32	Mute Group 29	Mute Group 30	Mute Group 31	Mute Group 32
13	10110000	Preset Recall 1-4	Preset Recall 1	Preset Recall 2	Preset Recall 3	Preset Recall 4
14	01110000	Preset Recall 5-8	Preset Recall 5	Preset Recall 6	Preset Recall 7	Preset Recall 8
15	11110000	Preset Recall 9-12	Preset Recall 9	Preset Recall 10	Preset Recall 11	Preset Recall 12
16	00001000	Preset Recall 13-16	Preset Recall 13	Preset Recall 14	Preset Recall 15	Preset Recall 16
17	10001000	Preset Recall 17-20	Preset Recall 17	Preset Recall 18	Preset Recall 19	Preset Recall 20
18	01001000	Preset Recall 21-24	Preset Recall 21	Preset Recall 22	Preset Recall 23	Preset Recall 24
19	11001000	N/A	N/A	N/A	N/A	N/A
20	00101000	N/A	N/A	N/A	N/A	N/A
21	10101000	Force On Group 1-4	Force On Grp 1	Force On Grp 2	Force On Grp 3	Force On Grp 4
22	01101000	Force On Group 5-8	Force On Grp 5	Force On Grp 6	Force On Grp 7	Force On Grp 8
23	11101000	Force On Group 9-12	Force On Grp 9	Force On Grp 10	Force On Grp 11	Force On Grp 12
24	00011000	Force On Group 13-16	Force On Grp 13	Force On Grp 14	Force On Grp 15	Force On Grp 16
25	10011000	Force On Group 17-20	Force On Grp 17	Force On Grp 18	Force On Grp 19	Force On Grp 20
26	01011000	Force On Group 21-24	Force On Grp 21	Force On Grp 22	Force On Grp 23	Force On Grp 24
27	11011000	Force On Group 25-28	Force On Grp 25	Force On Grp 26	Force On Grp 27	Force On Grp 28
28	00111000	Force On Group 29-32	Force On Grp 29	Force On Grp 30	Force On Grp 31	Force On Grp 32
29	10111000	Force Off Group 1-4	Force Off Grp 1	Force Off Grp 2	Force Off Grp 3	Force Off Grp 4
30	01111000	Force Off Group 5-8	Force Off Grp 5	Force Off Grp 6	Force Off Grp 7	Force Off Grp 8
31	11111000	Force Off Group 9-12	Force Off Grp 9	Force Off Grp 10	Force Off Grp 11	Force Off Grp 12
32	00000100	Force Off Group 13-16	Force Off Grp 13	Force Off Grp 14	Force Off Grp 15	Force Off Grp 16
33	10000100	Force Off Group 17-20	Force Off Grp 17	Force Off Grp 18	Force Off Grp 19	Force Off Grp 20
34	01000100	Force Off Group 21-24	Force Off Grp 21	Force Off Grp 22	Force Off Grp 23	Force Off Grp 24
35	11000100	Force Off Group 25-28	Force Off Grp 25	Force Off Grp 26	Force Off Grp 27	Force Off Grp 28
36	00100100	Force Off Group 29-32	Force Off Grp 29	Force Off Grp 30	Force Off Grp 31	Force Off Grp 32
37	10100100	Combine Group 1-4	Combine 1	Combine 2	Combine 3	Combine 4
38	01100100	Combine Group 5-8	Combine 5	Combine 6	Combine 7	Combine 8
39	11100100	Combine Group 9-12	Combine 9	Combine 10	Combine 11	Combine 12
40	00010100	Combine Group 13-16	Combine 13	Combine 14	Combine 15	Combine 16
41-255		For Future Updates				

Appendix D: Level Remote Predefined Functions

DX-RVC Remote Volume Control (2-button/12-LED)

ID	Switch Positions 1 through 8	Function	In/Out
0	00000000	Input Level	1A
1	10000000	Input Level	1B
2	01000000	Input Level	1C
3	11000000	Input Level	1D
4	00100000	Input Level	1E
5	10100000	Input Level	1F
6	01100000	Input Level	1G
7	11100000	Input Level	1H
8	00010000	Input Level	1I
9	10010000	Input Level	1J
10	01010000	Input Level	2A
11	11010000	Input Level	2B
12	00110000	Input Level	2C
13	10110000	Input Level	2D
14	01110000	Input Level	2E
15	11110000	Input Level	2F
16	00001000	Input Level	2G
17	10001000	Input Level	2H
18	01001000	Input Level	2I
19	11001000	Input Level	2J
20	00101000	Input Level	3A
21	10101000	Input Level	3B
22	01101000	Input Level	3C
23	11101000	Input Level	3D
24	00011000	Input Level	3E
25	10011000	Input Level	3F
26	01011000	Input Level	3G
27	11011000	Input Level	3H
28	00111000	Input Level	3I
29	10111000	Input Level	3J
30	01111000	Input Level	4A
31	11111000	Input Level	4B
32	00000100	Input Level	4C
33	10000100	Input Level	4D
34	01000100	Input Level	4E
35	11000100	Input Level	4F
36	00100100	Input Level	4G
37	10100100	Input Level	4H
38	01100100	Input Level	4I
39	11100100	Input Level	4J
40	00010100	Input Level	5A
41	1001010	Input Level	5B
42	01010100	Input Level	5C
43	11010100	Input Level	5D
44	00110100	Input Level	5E
45	10110100	Input Level	5F
46	01110100	Input Level	5G
47	11110100	Input Level	5H
48	00001100	Input Level	5I
49	10001100	Input Level	5J
50	01001100	Input Level	6A
51	11001100	Input Level	6B
52	00101100	Input Level	6C
53	10101100	Input Level	6D
54	01101100	Input Level	6E
55	11101100	Input Level	6F
56	00011100	Input Level	6G
57	10011100	Input Level	6H
58	01011100	Input Level	6I
59	11011100	Input Level	6J
60	00111100	Input Level	7A
61	10111100	Input Level	7B
62	01111100	Input Level	7C
63	11111100	Input Level	7D
64	00000010	Input Level	7E
65	10000010	Input Level	7F
66	01000010	Input Level	7G
67	11000010	Input Level	7H
68	00100010	Input Level	7I
69	10100010	Input Level	7J
70	01100010	Input Level	8A
71	11100010	Input Level	8B
72	00010010	Input Level	8C
73	10010010	Input Level	8D
74	01010010	Input Level	8E
75	11010010	Input Level	8F
76	00110010	Input Level	8G
77	10110010	Input Level	8H
78	01110010	Input Level	8I
79	11110010	Input Level	8J
80	00001010	Output Level	A
81	10001010	Output Level	B
82	01001010	Output Level	C
83	11001010	Output Level	D
84	00101010	Output Level	E
85	10101010	Output Level	F
86	01101010	Output Level	G
87	11101010	Output Level	H
88	00011010	Output Level	I
89	10011010	Output Level	J
90	01011010	Group Level	1
91	11011010	Group Level	2
92	00111010	Group Level	3
93	10111010	Group Level	4
94	01111010	Group Level	5
95	11111010	Group Level	6
96	00000110	Group Level	7
97	10000110	Group Level	8
98	01000110	Group Level	9
99	11000110	Group Level	10
100	00100110	Group Level	11
101	10100110	Group Level	12
102	01100110	Group Level	13
103	11100110	Group Level	14
104	00010110	Group Level	15
105	10010110	Group Level	16
106	01010110	Group Level	17
107	11010110	Group Level	18
108	00110110	Group Level	19
109	10110110	Group Level	20
110	01110110	Group Level	21
111	11110110	Group Level	22
112	00001110	Group Level	23
113	10001110	Group Level	24
114	01001110	Group Level	25
115	11001110	Group Level	26
116	00101110	Group Level	27
117	10101110	Group Level	28
118	01101110	Group Level	29
119	11101110	Group Level	30
120	00011110	Group Level	31
121	10011110	Group Level	32
122-255		Reserved for future updates	

MACKIE®

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